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ABSTRACT

In order to determine if Rasch Model procedures have any utility for equating pre-existing tests, this study reanalyzed the data from the equating phase of the Anchor Test Study which used a variety of equipercentile and linear model methods. The tests involved included seven reading test batteries, each having from one to three levels and two forms, and each having a vocabulary and comprehension subtest. There were 28 form-level combinations possible. Therefore, of concern was the simultaneous equating of 28 tests for each of vocabulary, comprehension, and total scores. Seven objectives characterized the study and are elaborated on in separate sections of this report. The objectives were to: (1) describe a methodology for test equating using the Rasch Model, (2) describe basic item analysis data for each test in the Anchor Test Study data base, (3) evaluate the fit of the Rasch Model with respect to those tests that were part of the data base, (4) investigate the stability of Rasch Model parameter estimates under conditions of varying sample size and sample composition, (5) provide tables of equated based on Rasch Model methods, (6) estimate the equating error associated with the use of these equating methods, and (7) compare the results of equating with those obtained in the Anchor Test Study. (RC)

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EQUATING READING TESTS WITH THE RASCH MODEL

Volume I, Final Report

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EQUATING READING TESTS WITH THE RASCH MODEL

FINAL REPORT

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Preface

The present two volumes represent the major output of a project designed to discover whether or not the Rasch Model has any utility in the equating of pre-existing tests. Essentially, we reanalyzed the data from the equating phase of the Anchor Test Study. We believe that in terms of Rasch Model research, this study is the largest (number of tests included and sample size) to date where attempts have been made to use the model outside of a test construction context. We have, however, provided some guidelines for those interested in test construction.

There are many aspects of the data that are not fully exploited in these reports. We have tried to write these volumes from a rather narrow perspective when dealing with the Rasch Model; yet, we have tried to achieve some degree of comprehensiveness with respect to the equating process. There are many things yet to be learned and much left to do. If some of the ideas presented here spark interest, we invite you to join us.

A number of people have contributed to this effort. First and foremost, Dr. Charles H. Hammer, our U. S. O. E. project officer, has been most patient and helpful. He has always exhibited a high degree of professionalism.

Our respect and appreciation go to Dr. Peter Loret and his colleagues at ETS who produced the Anchor Test Study. They have made a significant contribution. When we received the data from Peter on computer tapes,

each tape contained exactly the information he said it contained, and each record contained all the information that was supposed to be there. Those of you with some data processing experience know that this is not a small achievement.

The project funding enabled us to secure the consultant services of Professor Benjamin D. Wright and Professor Georg Rasch. The ten days they spent with use were productive and insightful. Georg Rasch is a remarkable man. He has energy, enthusiasm and a respectful attitude toward data. Ben Wright continues to assist us in our work. Many of the specific procedures used here, especially with regard to equating, were suggested by him. His intellectual contribution to this study was invaluable.

Finally, we wish to thank the staff of the Educational Research Laboratory. Many of them have made contributions and provided assistance. Donna Wortley typed the manuscript in many versions and is happy that we finally decided what to say. She has made our job much easier than it could have been.

Chapter 1

Introduction

In 1960 Georg Rasch published a book, Probabilistic Models for Some Intelligence and Attainment Tests, in which he described several mathematical models for representing responses to test questions. One of these models, which Rasch calls the simple item analysis model, has become popularly known as "the Rasch Model".[1]

While a smattering of research on the Rasch Model appeared in this country between 1960 and 1967, it was not until the 1967 ETS Invitational Conference on Testing that the interest of the American measurement community was stirred. Professor Benjamin Wright's paper on "Sample-free Test Calibration and Person Measurement", presented at that conference, has probably served to popularize the Rasch Model more than any other work. Research dated since the Wright paper now numbers well over 300 papers. Proponents of the Rasch Model advocate its use in test development largely on the basis that the model promises to achieve two important consequences long deemed desirable by psychometricians: (1) item calibrations that are independent of the calibrating sample; and (2) person measurement that is independent of a specific set of items.

There are several implications of these consequences: (1) Any

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[1] Throughout this paper we will employ the convention of referring to Rasch's simple item analysis model as the "Rasch Model".

appropriate collection of individuals can be used in the calibration process as opposed to resorting to some elaborate sampling plan; (2) given a pool of calibrated items, any subset of that pool can be used to measure an individual. All such subsets will estimate ability on a common scale. This latter condition greatly simplifies the problem of equating different tests and the former condition renders obsolete the special attention given to sampling plans when, for example, achievement tests are nationally standardized.[2] If different collections of items (e.g., different tests) can be used to make measurements on a common scale, then the fundamental problem of test equating is solved.

It is the primary purpose of this research to investigate the use of the Rasch Model for equating reading achievement tests, specifically those reading tests used in the Anchor Test Study (ATS) (Loret, Seder, Bianchini & Vale, 1974). A number of objectives guided the investigation of the reanalysis of the Anchor Test Study. These objectives are summarized here and elaborated upon in subsequent sections of this report.

1.1 Objectives

1. To describe a methodology for test equating using the Rasch model.
2. To provide basic item analysis data for each test in the Anchor Test Study data base.
3. To evaluate the fit of the Rasch Model with respect to those tests that were part of the data base.
4. To investigate the stability of Rasch Model parameter estimates under conditions of varying sample size and sample composition.

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[2] The above comments do not refer to the collection of norms data but only that process used in typical data collection activities for item analysis and test equating purposes.

5. To provide tables of equated scores based on Rasch Model methods.

6. To estimate the equating error associated with the use of the above equating methods.

7. To compare the results of equating with those obtained in the Anchor Test Study.

1.2 Background and Significance

Jaeger (1973) described quite well the motivation that gave rise to the support by the USOE of a study to equate several of the most commonly used reading achievement tests. His discussion of both the scientific and practical merits of the national test-equating study in reading (called the Anchor Test Study) points to four areas in which the Anchor Test Study distinguishes itself:

1) Its fulfillment of a long-standing objective of the measurement community, i.e., the equating of widely used achievement tests in reading comprehension and vocabulary.

2) Its scope - it required administration of nearly 500,000 reading comprehension and vocabulary tests to over 300,000 children in 1,650 elementary schools in all 50 states.

3) Its widespread support - the study carried the endorsement of the U. S. Commissioner of Education, 49 of the nations's Chief State School Officers, and district superintendents and principals representing more than 1,600 schools in all 50 states.

4) Its quality - it provides new national norms for the achievement tests used, based on an unprecedented school cooperation rate of over 90 percent and a sample more nearly representative of children enrolled in U. S. public and private elementary schools than ever before achieved.

The reanalysis of the Anchor Test Study data by Rasch Model techniques is the first in a potential series of studies that will utilize the Anchor Test Study data base in an attempt to extend our knowledge about test equating in general. If, for example, it can be shown that Rasch Model procedures can be used to equate tests like those used in the Anchor Test Study, then considerable savings might be realized in future

equating efforts. Extensive data collection activities, elaborate sampling plans and sophisticated analyses are expensive to execute, yet these are the very elements for which the Anchor Study should be credited. Unfortunately, the merits of the Anchor Test Study are also the features that make such a study impractical for most organizations.

Of more specific interest here is the issue of whether or not Rasch Model methods can be used with existing tests for test equating purposes. In theory, equating with the Rasch Model is a simple and straightforward concept, requiring only that student performance on both tests to be equated can be reasonably described by the Rasch Model. Thus, an important aspect of this study is the degree to which the tests used can be considered to satisfy those conditions that allow appropriate use of the Rasch Model. The issues of model-data fit are not simple. Compared with the mechanics of item and test calibration and test equating, the procedures for evaluating fit are much more elusive.

It seems quite clear at present that tests can be constructed to the specifications of the Rasch Model. It is not at all clear what the limits of utility are for existing, intact tests when those tests are analyzed by Rasch Model procedures. In other words, to what extent will the consequences of the model be achieved under conditions of less than ideal correspondence with model specifications?

1.3 The Data Base

The data that were used in this study were collected specifically for the Equating Phase of the Anchor Test Study. The purpose of the Anchor Test Study was to provide a method for translation of a score on one of seven widely used standardized reading tests to a score on any

of the other tests.[3]

The United States Office of Education (USOE) initially determined seven of the more frequently used reading achievement tests appropriate for grades 4, 5, and 6. Two forms of each test were chosen, a primary form (the one most frequently used) and its secondary (alternate) form. Each reading test could be divided into a vocabulary subtest and a comprehension subtest. Equating was independently performed for each subtest and the total test at each of the three grade levels. This required the administration of appropriate pairs of reading achievement tests to fourth, fifth, and sixth grade students randomly selected from public and non-public schools in the United States.

In the study reported here, the seven tests were considered as twenty-eight tests by separating them into their various forms and levels. (The test batteries and the various forms and levels are shown in Table 1.3.1.) In this scheme of data organization, the particular grade(s) in which a test was administered was disregarded. With STEP having only one level, ITBS having three levels, and the other five batteries having two levels, there are fourteen primary and secondary forms that can be identified. Thus, the Rasch Study results are presented with each of the fourteen primary forms used as a base test with its secondary form and the other thirteen primary forms being equated to it. Therefore, only fourteen equating tables are necessary, each showing the

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[3] After the inception of the study herein reported, an eighth test was added to the ATS data base; that test was not available at the time this study was begun and has not been included here.

TABLE 1.3.1

Data Set Numbers, Test Description Codes, and

Number of Items.

	Test Description Codes				Number of Items	
DSN No.	Test Name	Form	Level	Grade	Vocabulary	Comprehension
01	CAT	A	3	4,5	40	42
02	CAT	B	3	4,5	40	42
03	CAT	A	4	6	40	45
04	CAT	B	4	6	40	45
05	CTBS	Q	2	4,5	40	45
06	CTBS	R	2	4,5	40	45
07	CTBS	Q	3	6	40	45
08	CTBS	R	3	6	40	45
09	ITBS	5	10	4	38	68
10	ITBS	6	10	4	38	68
11	ITBS	5	11	5	43	74
12	ITBS	6	11	5	43	74
13	ITBS	5	12	6	46	76
14	ITBS	6	12	6	46	76
15	MAT	F	ELE.	4	50	45
16	MAT	G	ELE.	4	50	45
17	MAT	F	INT.	5,6	50	45
18	MAT	G	INT.	5,6	50	45
19	STEP II	A	4	4,5,6	30	30
20	STEP II	B	4	4,5,6	30	30
21	SRA	E	BLUE	4,5	42	48
22	SRA	F	BLUE	4,5	42	48
23	SRA	E	GREEN	6	42	48
24	SRA	F	GREEN	6	42	48
25	SAT	W	INT. I	4	38	60
26	SAT	X	INT. I	4	38	60
27	SAT	W	INT. II	5,6	48	64
28	SAT	X	INT. II	5,6	48	64

* All items contain four alternatives except for items 35 through 42 in CAT Level 3 Form A and CAT Level 3 Form B and items 35 through 45 in CAT Level 4 Form A and CAT Level 4 Form B, which contain five.

raw scores for the base test plus the equated raw scores for its secondary form and the primary forms of the other thirteen tests.

The target population of subjects for the ATS was all fourth, fifth, and sixth grade students in the United States who would not be limited in taking the tests because of a physical or mental handicap or who did not know English; therefore, a Sampling Phase was necessary to establish a national probability sample of grades 4, 5, and 6 to establish equating relationships among the seven tests.

The Rasch Study required a reorganization of the data base that was used for the ATS. Two methods of grouping data comprised the project organization with all data grouped without regard to the grade of the examinees. First, a Basic File was created by grouping together all test data for a single test disregarding both pairing and order of administration. This created 28 subfiles in the Basic File. This file was used in the test calibration phase of the project, for item analysis, and to study the model and its fit.

The second file, the Paired File, was created by grouping all independent test pairs without regard to the grade of the students. This grouping method yielded 136 subfiles of independent test pairs as is shown by the sample sizes in Table 1.3.2. Each entry in this design matrix represents that particular test pair identified by the row and column index "DSN" (data set number). The row index identifies the test administered first in the sequence. Notice that all indexes are odd numbers. This was a processing convenience since there was some advantage to keeping a test's primary and secondary form together in the organizational sequence. Whenever the test was administered with its alternate (secondary) form, it appears on the diagonal, which shows two

TABLE 1.3.2

SAMPLE SIZES FOR THE CELLS IN THE EQUATING DESIGN MATRIX

DSN NO.	01	03	05	07	09	11	13	15	17	19	21	23	25	27
01	1879 1935		1986		775	821		943	940	1352	1435		729	800
03		990 936		1048			836		832	696		723		821
05	1831		1716 1573		608	736		677	695	1842	1642		831	699
07		804		733 815			628		699	857		927		782
09	682		697		1041 1054			752		680	623		823	
11	678		626			1114 1081			750	606	641			847
13		644		700			1131 1047		592	612		889		875
15	948		614		717			844 775		921	871		719	
17	954	911	654	707		784	641		1691 1561	1964	913	889		1431
19	1492	693	1685	775	550	665	638	986	1855	2425 2225	1461	1068	687	1397
21	1429		1658		616	747		915	805	1668	1732 1538		808	819
23		774		948			971		952	912		705 762		812
25	876		756		916			584		789	754		631 630	
27	908	836	799	709		819	904		1241	1622	870	969		1331 1472

sample sizes. These numbers distinguish between the order of administration of primary and secondary forms. The first number is the sample size for the primary form administered first the second number is for the primary form administered second. The Paired File was used to estimate the equating constants (see Chapter 3) and to study model-data fit.

1.4 A Frame of Reference for the Rasch Model

Georg Rasch (1960) proposed several models for achievement measures. We are concerned with only his "simple item analysis model" which is appropriate for a measure composed of a set of questions, scored correct or incorrect.

Rasch (1973) proposed that all measurement be constructed with a specific "frame of reference." That is, one should carefully consider the population of persons to be measured (what Wright calls the "target") and the domain of tasks that defined the trait to be assessed. Rasch (1966) proposed that one should create measurements such that comparisons of persons in the target population or comparisons of tasks in the task domain should be invariant with respect to the specific sample of tasks or persons that one observes. This invariance property was called "specific objectivity" to show that the invariance is limited to the specific frame of reference. His work led to an important conclusion; namely, that there exists one model for tests that is both necessary and sufficient for yielding specific objectivity. (Rasch, 1966; Schmidt, 1970).

There are only two sets of parameters in the model--one for persons (abilities) and one for items (easiness). The introduction of other parameters will lead to other models and; thus, potentially to a loss of

specific objectivity.

Let a particular person be characterized by an ability parameter ξ and a particular item be characterized by an easiness parameter ε. Then the odds for the person responding correctly to the item is $\xi\varepsilon$. This is the simplest form of the model. It can be rewritten as the probability statement $\xi\varepsilon/(1 + \xi\varepsilon)$.

If one considers all persons, that is, if ξ is considered a variable, then the simple model is a model for the item characteristic curve of the item. There are several well-known models for item characteristic curves. Specifically, the normal ogive and the logistic function are often used, wherein there are two or three item parameters (easiness, discrimination, and guessing parameters). For example, see Lord and Novick (1968) for a review of normal ogive and logistic function models. It can be shown that Rasch's simple model is a logistic function with only item parameter, the easiness parameter. Thus, the literature on item characteristic curves is relevant to the study of Rasch's Model.

The estimation of the two sets of parameters in the Rasch Model is called "test calibration". Test calibration consists of obtaining two sets of information. One is the easiness estimate of all items. The second is a table giving an ability estimate corresponding to each possible raw score. A procedure for obtaining these estimates is the unconditional maximum likelihood procedure. The maximum likelihood estimates are generated by MESAMAX, a computer program based on a paper by Wright and Panchapakesan (1969). Volume II of this report gives the calibrations for items and abilities for all tests. Volume II also presents for comparison some traditional item analyses results.

The model and its properties are presented more fully in Chapter 2. There, it is shown how the model leads to test construction guidelines and to guidelines for assessing the degree to which the model is appropriate for various sets of data.

Chapter 2

Evaluating Fit To The Rasch Model

The issue of whether or not a particular test fits the Rasch Model is basic to the utility of the model and the attainment of the consequences which the model promises to achieve. The problem of model fit is not at all simple. The concept of testing or evaluating fit almost always implies the examination of some appropriate set of data. Part of the problem of evaluating fit is determining which data are appropriate for use in the evaluation process. Should one deal with the fit of each individual item or the test as a whole? Does a small proportion of nonfitting items prohibit the use of the model for a particular test? How much misbehavior in the data will the model tolerate? Each of these questions implies some concern for evaluating model-data fit.

2.1 The Problem of Model-Data Fit

It is the thesis here that there exists two rather fundamentally different types of applications of the Rasch Model that call for correspondingly different concepts of model-data fit. The two types of applications will be called test construction and test analysis and the corresponding concepts of fit will be referred to as item fit for the former situation and test fit for the latter. The purpose of this chapter is to define these application situations and their respective concepts of fit, and to illustrate the notion of test fit by applying its principles to the reading achievement tests.

The primary difference between the situations referred to as test construction and test analysis is the freedom to manipulate the test at the item level. In the case of test construction, the Rasch Model can be used as a guide, or blueprint, for the selection of those items that will compose the test. The attention of the test maker is on developing or finding a set of items that in some acceptable sense can be said to fit the model. The test maker has the freedom at this item analysis juncture of his task to discard poorly fitting items, retain good items, and modify other items as needed. Thus, for this application, indicators of model-data fit are necessary for items, the presumption being that the final collection of items will include only those that meet whatever criteria for fit might be established.

In the situation called test analysis, the particular collection of test items is fixed. There is no freedom to discard poor items. Rather, the objective in this case is to derive whatever benefits the model is robust enough to provide under potentially less than ideal item fit conditions. The chances are quite good that some proportion of items in the given test would not have met a criterion for "fit" had the items been evaluated during test construction. The extent to which items defined as nonfitting, on the basis of item fit indicators, can be allowed to contaminate a collection of fitting items is, of course, a matter for investigation. The fact that the model has been shown to be robust (i.e., the model tolerates some leniency with respect to strict adherence to its assumptions) when some poor fitting items were present (Panchapakesan, 1969, C. Rentz, 1975), lends credence to the notion that the area of test analysis might be a fruitful area to explore. This is precisely the situation that gave rise to the investigation on which we

are now reporting.

Georg Rasch (1966) proposed what he calls the simple item analysis model as a way of achieving a desirable measurement principle called specific objectivity. Rasch has more formally defined specific objectivity as "... whenever the comparison of any two parameters within the same set may be carried out in such a way that it (the comparison) is unaffected by all other unknown parameters in the system ... the comparison is characterized as 'specifically objective'." One implication of this principle, for example, is that the difference between the parameters of any two items is invariant with respect to the particular ability parameters of a particular sample. This has the same implication as Wright's (1968) phrase "sample free item calibration."

Actually, specific objectivity is an integral and formal part of Rasch's model when the model is stated in the general form of the hypothetical or IF-THEN statement, where the IF-clause represents assumptions and the THEN-clause specifies the consequences. Figure 2.1.1 symbolizes this structure and shows the formal relationship between Rasch's (1966) three assumptions and specifice objectivity as the consequence.

It is interesting to note that many writers represent the Rasch Model by reference to assumptions 1 and 2, while our own preference is for representation based on the entire structure. The advantage of such a representation is that it permits some clarity to be introduced into such questions as: What are the assumptions of the model? What are its consequences? And, what is the difference between these and deductions derived from them? For example, conditions that are commonly identified as necessary for model fit are unidimensionality of the trait being

Figure 2.1.1: Rasch's Item Analysis Model

$$\underline{\text{IF}} \quad \left\{ \begin{array}{l} 1.\ P_{ij} = \dfrac{\lambda_{ij}}{1 + \lambda_{ij}} \\ \\ 2.\ \lambda_{ij} = \xi_j \varepsilon_i \\ \\ 3.\ \text{stochastic independence} \end{array} \right\} , \underline{\text{THEN}} \left[\begin{array}{l} \text{specific} \\ \text{objectivity} \end{array} \right]$$

The three assumptions, only symbolized above, may be stated more fully as follows (adapted from Rasch, 1966, pg. 50):

1. To each situation in which a person j (j = 1, 2 ... n) is to answer an item i (i = 1, 2 ... m) there is a corresponding probability of a correct answer ($X_{ij} = 1$) which may be written

$$P(X_{ij} = 1) = \frac{\lambda_{ij}}{1 + \lambda_{ij}} \quad , (\lambda_{ij} > 0)$$

2. The situation parameter λ_{ij} is the product of two factors,

$$\lambda_{ij} = \xi_j \varepsilon_i$$

where ξ_j pertains to the person and ε_i to the item; these parameters have been called respectively item easiness and person ability.

3. Given the values of the parameters, all answers are stochastically independent.

measured, equal item discriminations, and the absence of guessing. These conditions are not assumptions, but they can be easily deduced from the assumptions. For example, since assumption 2 specifies only one item parameter and one person parameter, it is clear that "variation" in any other characteristic of either items or persons can not be permitted. Thus, some of those traditional constructs such as item discrimination and guessing have not been parameterized. It is perhaps more proper to identify these and other such deductions from the assumptions as antecedent conditions, since they are derived from the antecedent clause of the logical if-then statement.

Similarly, it is possible to deduce from the model's consequence component, that is, specific objectivity, certain other conditions variously referred to as implications, outcomes, and consequences, such as Wright's phrase "sample free item calibration." All such logical deductions from the model's consequences will be referred to as consequent conditions, for reasons corresponding to those previously stated, since they are derived from the consequence clause.

The differences between the model's assumptions and consequences and the conditions which they imply is that both the antecedent and consequent conditions are data related; they enable us to translate the formal statement of the model into constructs that are a bit more operational. These conditions are operational whereas the model and its elements are merely psychometric symbols. Evaluation of model-data fit must deal at the level of the antecedent and consequent conditions since it is at this level that data can be mustered for the evaluation. A difference between the model's assumptions and its consequences is that the assumptions deal with items and the consequences imply sets of

items or tests. Thus, antecedent conditions are most likely to lead to indicators of item fit; whereas, consequent conditions might be most useful in describing test fit.

These relationships lead to one way of defining item and test fit. Item fit can be defined as the extent to which items can be characterized according to those antecedent conditions derived from the model's assumptions. Test fit can be defined as the extent to which the test achieves those consequences specifiable from the concept of specific objectivity.

Test fit might also be defined as the extent to which the test contains fitting items, for example, in terms of a proportion of items that fit the model, using some specified criterion of item fit. Thus, two general approaches to the concept of test fit seem to be attractive; the first based on the test's achieving specified consequent conditions and the second based on the test's item composition. It might well turn out that different methods of evaluating fit will be called for depending on the particular problem area application. Yet, scientifically we ought to expect some degree of convergence among the different ways of examining presumably the same thing. Thus, this issue is examined to some extent in the present work.

In the present project we have taken the position that the consequent condition approach to test fit is the most relevant consequence for equating. The specific consequent condition is the stability of Rasch ability parameter estimates. The ability parameters of the model are supposed to be invariant with respect to any other person parameters. Consequently, an examination of this consequent condition should help us evaluate that aspect of the degree of model-data fit that is most relevant and, as

such, provide information on the usefulness of the model for equating those reading tests in the present sample.

Our definition of equating involves only the raw scores and those ability values estimated for them. Thus, given a common scale and as long as the values in the "scoring table" (i.e., the set of all raw score and ability estimates) remain constant for two tests, the equating results cannot vary. This means that systematic variation in calibration conditions (such as race, sex, grade) is inconsequential as long as "scoring tables" remain invariant.[4] This invariance or stability of ability estimates is the most direct measure of the Model's usefulness for equating; however, an examination of item stability as well as examination of certain antecedent conditions should also provide useful information to evaluate model-data fit.

2.2 Stability of Parameter Estimates

In order to study how various factors influence the stability of estimates, it is necessary to define a measure of stability that can be compared across different tests and across different analyses of the same test. The word "stability" implies that a set of estimates of the same parameter (i.e., for a single item or single raw score) will be invariant over repeated observations. The ordinary standard deviation can be used as a measure of this invariance. Specifically, whenever

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[4] There are applications where item stability would be significantly more important. One such application is tailored testing, in which there is an attempt to match items to people, and since misfit affects the stability of items, more than it does the abilities, a higher degree of fit would be required than that necessary for applications requiring only stable ability estimates.

we have multiple occasions to estimate an item parameter, the standard deviation of the distribution of estimates can be used to describe the stability of that item's estimate. If we want to summarize stability for a test, with respect to the items, then the average of these standard deviations will do quite well. Similar procedures can be used for the ability estimates. This average of standard deviations we will call a "stability index" and use it as a measure of invariance throughout this report. The index takes low values when stability in high and increases as stability decreases.

It is useful at this point to remind the reader that throughout this study we have reported the parameter estimates in the natural log units in which they are traditionally reported. Thus, both item easiness and person ability are measured on a common scale; comparisons of the stability of these estimates are consequently appropriate.

2.3 Stability as a Function of Sample Size

The purpose of this analysis was to determine the effect of sample size on the stability of Rasch parameter estimates. This issue provides a good point of departure for studies of stability since it provides some information on the expected variability of the easiness and ability parameter estimates, over random replication of samples of the same size, with tests composed of items typical of those in the present project.

STEP vocabulary was used in this analysis since there were more observations on it (N = 33, 123) than on any other test and those observations spanned all three grades. Fifteen random samples were drawn from the STEP data file for each of four sample sizes: 500, 1000, 2,000, 4,000. Each of these sets of data were then analyzed by the MESAMAX item

analysis program, and summary statistics were computed over the 15 replications of each sample size.

Table 2.3.1 through 2.3.5 show the results of this analysis for the item easiness parameter estimates and Tables 2.3.5 through 2.3.8 show the results for the ability parameter estimates. Each table contains either the item number or the score group number and the mean, standard deviation, maximum estimate, minimum estimate, and range computed over the 15 replications of that particular sample size.

Of particular interest is the standard deviations listed in these tables. They provide an index of the stability of a particular parameter estimate and can be compared across analyses. In general the results show that the stability measures improve with sample size. Table 2.3.9 provides this comparison in summary form. It shows the mean of these "stability indexes" (standard deviations) computed over the 30 items and 29 score groups.

Table 2.3.9 shows that the ability estimates are more stable than the item easiness estimates. There is some tendency for the stability of the ability estimates to get better with increases in the size of the calibrating sample. The fact that easiness estimates are more sensitive to different sample sizes than are ability estimates is not unexpected nor mysterious. The basic observation for estimating easiness is, p, the proportion answering the item correct, a number whose accuracy depends directly on the sample size. The stability of ability estimates depends on both the item easiness estimates and the number of items. Thus the extent of sample size influence on ability estimates is limited by its influence on item easiness. Furthermore the influence of item easiness variability tends to attenuate as the number of items become greater.

TABLE 2.3.1

Stability of Item Parameter Estimates

as a Function of Sample Size (N=500)

ITEM NO	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	1.7218	0.1887	2.0320	1.4420	0.5900
2	2.3183	0.1484	2.5450	1.9780	0.5670
3	2.0204	0.1289	2.2290	1.7550	0.4740
4	1.3085	0.1452	1.5340	1.0060	0.5280
5	1.5041	0.1648	1.8790	1.2580	0.6210
6	1.1445	0.1174	1.3460	0.9270	0.4190
7	1.7083	0.1200	1.9030	1.4620	0.4410
8	1.3096	0.1185	1.5290	1.1420	0.3870
9	1.3311	0.1577	1.5300	0.9790	0.5510
10	0.1499	0.0982	0.3280	0.0410	0.2870
11	0.0549	0.1167	0.2380	-0.1290	0.3670
12	0.5691	0.0867	0.7180	0.4410	0.2770
13	0.8094	0.1197	1.0030	0.5790	0.4240
14	0.4660	0.1327	0.6470	0.2270	0.4200
15	0.2786	0.1463	0.5210	-0.0200	0.5410
16	0.0228	0.1241	0.2400	-0.1730	0.4130
17	0.5767	0.1284	0.7660	0.2550	0.5110
18	-0.1393	0.1561	0.1980	-0.3420	0.5400
19	-0.0598	0.0861	0.0540	-0.2140	0.2680
20	-1.6046	0.0682	-1.4910	-1.6890	0.1980
21	-1.4297	0.0742	-1.2720	-1.5410	0.2690
22	-0.8953	0.0937	-0.7390	-1.0620	0.3230
23	-0.5511	0.0834	-0.4520	-0.6910	0.2390
24	-1.5515	0.1411	-1.2360	-1.7670	0.5310
25	-1.6381	0.0961	-1.5070	-1.8120	0.3050
26	-0.8983	0.0741	-0.7260	-1.0060	0.2800
27	-1.9275	0.1410	-1.6200	-2.2230	0.6030
28	-1.9412	0.1040	-1.8080	-2.1730	0.3650
29	-2.4157	0.1177	-2.2320	-2.7080	0.4760
30	-2.2405	0.1404	-2.0450	-2.5720	0.5270

TABLE 2.3.2

Stability of Item Parameter Estimates

as a Function of Sample Size (N=1000)

ITEM NO	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	1.7691	0.0922	1.9200	1.6360	0.2840
2	2.3377	0.1220	2.5700	2.1330	0.4370
3	2.0643	0.1352	2.2620	1.7630	0.4990
4	1.2292	0.0981	1.4090	1.0640	0.3450
5	1.5169	0.1110	1.8130	1.3650	0.4480
6	1.1358	0.0865	1.3330	0.9780	0.3550
7	1.7355	0.1305	1.9540	1.5580	0.3960
8	1.2961	0.0672	1.4290	1.1750	0.2540
9	1.3073	0.0928	1.4240	1.1420	0.2820
10	0.0842	0.0966	0.2080	-0.1720	0.3800
11	0.0741	0.0801	0.1970	-0.0740	0.2710
12	0.5735	0.0921	0.7030	0.4220	0.2810
13	0.8633	0.0652	0.9610	0.7640	0.1970
14	0.5171	0.1004	0.7110	0.3010	0.4100
15	0.2355	0.0683	0.3810	0.0890	0.2920
16	-0.0417	0.1016	0.1900	-0.2100	0.4000
17	0.5210	0.0842	0.6940	0.3830	0.3110
18	-0.1030	0.0593	-0.0120	-0.2220	0.2100
19	-0.0517	0.0860	0.0400	-0.2820	0.3220
20	-1.6085	0.1030	-1.4360	-1.8110	0.3750
21	-1.4496	0.0823	-1.2830	-1.5380	0.2550
22	-0.9125	0.0847	-0.7930	-1.0470	0.2540
23	-0.5265	0.1032	-0.3060	-0.7110	0.4050
24	-1.5437	0.0609	-1.4190	-1.6300	0.2110
25	-1.6020	0.0877	-1.4760	-1.7810	0.3050
26	-0.9130	0.0741	-0.7460	-1.0000	0.2540
27	-1.9228	0.0493	-1.8300	-1.9970	0.1670
28	-1.8934	0.0498	-1.8180	-1.9700	0.1520
29	-2.4455	0.1054	-2.3150	-2.7160	0.4010
30	-2.2469	0.1023	-2.0470	-2.4150	0.3680

TABLE 2.3.3

Stability of Item Parameter Estimates

as a Function of Sample Size (N=2000)

ITEM NO	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	1.7570	0.0663	1.9140	1.6570	0.2570
2	2.3178	0.0791	2.5220	2.2030	0.3190
3	2.0306	0.0774	2.1250	1.8560	0.2690
4	1.2369	0.0726	1.3400	1.0740	0.2660
5	1.5086	0.0814	1.6420	1.3550	0.2870
6	1.1482	0.0614	1.2350	1.0100	0.2250
7	1.7115	0.0720	1.8450	1.5810	0.2640
8	1.2905	0.0643	1.3920	1.1730	0.2190
9	1.3118	0.0619	1.4190	1.2020	0.2170
10	0.1226	0.0543	0.1970	0.0040	0.1930
11	0.0810	0.0542	0.1490	-0.0170	0.1660
12	0.5531	0.0644	0.7030	0.4160	0.2870
13	0.8519	0.0669	0.9600	0.7470	0.2130
14	0.5167	0.0551	0.5910	0.3910	0.2000
15	0.2407	0.0556	0.3740	0.1420	0.2320
16	-0.0443	0.0467	0.0560	-0.1180	0.1740
17	0.5290	0.0510	0.6480	0.4460	0.2020
18	-0.1118	0.0723	0.0300	-0.2860	0.3160
19	-0.0317	0.0517	0.0300	-0.1540	0.1840
20	-1.5915	0.0627	-1.4400	-1.6890	0.2490
21	-1.4457	0.0678	-1.3020	-1.5390	0.2370
22	-0.9170	0.0517	-0.8230	-0.9920	0.1690
23	-0.5321	0.0688	-0.4250	-0.6330	0.2080
24	-1.5295	0.0638	-1.4070	-1.6400	0.2330
25	-1.6088	0.0504	-1.4800	-1.7090	0.2290
26	-0.9016	0.0551	-0.7820	-1.0010	0.2190
27	-1.9362	0.0599	-1.8180	-2.0390	0.2210
28	-1.8965	0.0490	-1.7890	-1.9750	0.1860
29	-2.4223	0.0670	-2.3450	-2.6110	0.2660
30	-2.2390	0.0648	-2.1440	-2.3880	0.2440

TABLE 2.3.4

Stability of Item Parameter Estimates

as a Function of Sample Size (N=4000)

ITEM NO	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	1.7510	0.0535	1.8360	1.6280	0.2080
2	2.3279	0.0971	2.5200	2.1860	0.3340
3	2.0340	0.0569	2.1470	1.9150	0.2320
4	1.2581	0.0697	1.4910	1.1890	0.3020
5	1.5039	0.0393	1.5950	1.4370	0.1580
6	1.1564	0.0522	1.2580	1.0790	0.1790
7	1.7319	0.0733	1.9690	1.6500	0.3190
8	1.3023	0.0399	1.3980	1.2260	0.1720
9	1.3083	0.0592	1.4040	1.2210	0.1830
10	0.1356	0.0464	0.2260	0.0580	0.1680
11	0.0745	0.0581	0.1320	-0.0450	0.1770
12	0.5723	0.0488	0.7030	0.5130	0.1900
13	0.8583	0.0592	1.0190	0.7750	0.2440
14	0.5324	0.0762	0.7430	0.4380	0.3050
15	0.2321	0.0417	0.2870	0.1300	0.1570
16	-0.0439	0.0468	0.0570	-0.1200	0.1770
17	0.5401	0.0649	0.7280	0.4640	0.2640
18	-0.1120	0.0465	-0.0260	-0.1980	0.1720
19	-0.0435	0.0363	0.0280	-0.1190	0.1470
20	-1.6046	0.0579	-1.5250	-1.7430	0.2180
21	-1.4405	0.0211	-1.3950	-1.4770	0.0820
22	-0.9089	0.0467	-0.8460	-1.0290	0.1830
23	-0.5311	0.0436	-0.4520	-0.6390	0.1870
24	-1.5406	0.0494	-1.4700	-1.6940	0.2240
25	-1.6173	0.0478	-1.5450	-1.7330	0.1880
26	-0.9085	0.0385	-0.8510	-0.9890	0.1380
27	-1.9412	0.0932	-1.8050	-2.2060	0.4010
28	-1.9111	0.0383	-1.8690	-1.9900	0.1210
29	-2.4565	0.0830	-2.3700	-2.7170	0.3470
30	-2.2594	0.0586	-2.1750	-2.4200	0.2450

TABLE 2.3.5

Stability of Ability Parameter Estimates

as a Function of Sample Size (N=500)

SCORE GROUP	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	-4.0903	0.0421	-3.9880	-4.1470	0.1590
2	-3.3171	0.0388	-3.2240	-3.3680	0.1440
3	-2.8299	0.0357	-2.7450	-2.8760	0.1310
4	-2.4587	0.0328	-2.3820	-2.5000	0.1180
5	-2.1499	0.0297	-2.0810	-2.1870	0.1060
6	-1.8796	0.0266	-1.8190	-1.9120	0.0930
7	-1.6350	0.0239	-1.5820	-1.6630	0.0810
8	-1.4085	0.0211	-1.3630	-1.4330	0.0700
9	-1.1949	0.0184	-1.1560	-1.2150	0.0590
10	-0.9901	0.0158	-0.9590	-1.0070	0.0480
11	-0.7923	0.0133	-0.7680	-0.8090	0.0410
12	-0.5991	0.0111	-0.5800	-0.6150	0.0350
13	-0.4085	0.0092	-0.3930	-0.4240	0.0310
14	-0.2193	0.0078	-0.2060	-0.2340	0.0280
15	-0.0304	0.0073	-0.0200	-0.0440	0.0240
16	0.1597	0.0078	0.1730	0.1480	0.0250
17	0.3521	0.0091	0.3680	0.3360	0.0320
18	0.5481	0.0110	0.5660	0.5250	0.0410
19	0.7487	0.0133	0.7690	0.7190	0.0500
20	0.9556	0.0159	0.9780	0.9190	0.0590
21	1.1707	0.0185	1.1960	1.1280	0.0680
22	1.3963	0.0214	1.4250	1.3470	0.0780
23	1.6353	0.0242	1.6660	1.5800	0.0860
24	1.8929	0.0273	1.9260	1.8310	0.0950
25	2.1762	0.0302	2.2110	2.1090	0.1020
26	2.4981	0.0333	2.5350	2.4250	0.1100
27	2.8819	0.0367	2.9250	2.8030	0.1220
28	3.3809	0.0399	3.4320	3.2970	0.1350
29	4.1649	0.0434	4.2250	4.0760	0.1490

TABLE 2.3.6

Stability of Ability Parameter Estimates

as a Function of Sample Size (N=1000)

SCORE GROUP	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	-4.0946	0.0308	-4.0160	-4.1390	0.1230
2	-3.3205	0.0279	-3.2490	-3.3600	0.1110
3	-2.8323	0.0252	-2.7670	-2.8670	0.1000
4	-2.4601	0.0224	-2.4010	-2.4900	0.0890
5	-2.1505	0.0200	-2.0970	-2.1760	0.0790
6	-1.8796	0.0176	-1.8320	-1.9030	0.0710
7	-1.6344	0.0152	-1.5930	-1.6560	0.0630
8	-1.4073	0.0133	-1.3710	-1.4280	0.0570
9	-1.1933	0.0111	-1.1630	-1.2120	0.0490
10	-0.9884	0.0094	-0.9630	-1.0050	0.0420
11	-0.7903	0.0078	-0.7710	-0.8060	0.0350
12	-0.5968	0.0066	-0.5820	-0.6100	0.0280
13	-0.4063	0.0060	-0.3970	-0.4180	0.0210
14	-0.2170	0.0058	-0.2060	-0.2270	0.0210
15	-0.0282	0.0059	-0.0170	-0.0370	0.0200
16	0.1618	0.0066	0.1740	0.1530	0.0210
17	0.3541	0.0077	0.3670	0.3420	0.0250
18	0.5496	0.0087	0.5640	0.5320	0.0320
19	0.7500	0.0100	0.7660	0.7270	0.0390
20	0.9567	0.0112	0.9740	0.9290	0.0450
21	1.1713	0.0127	1.1900	1.1380	0.0520
22	1.3964	0.0144	1.4160	1.3580	0.0580
23	1.6351	0.0161	1.6560	1.5910	0.0650
24	1.8921	0.0179	1.9180	1.8430	0.0750
25	2.1752	0.0198	2.2060	2.1210	0.0850
26	2.4967	0.0217	2.5330	2.4380	0.0950
27	2.8803	0.0236	2.9220	2.8180	0.1040
28	3.3791	0.0256	3.4260	3.3130	0.1130
29	4.1633	0.0278	4.2160	4.0940	0.1220

TABLE 2.3.7

Stability of Ability Parameter Estimates

as a Function of Sample Size (N=2000)

SCORE GROUP	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	-4.0838	0.0191	-4.0550	-4.1200	0.0650
2	-3.3111	0.0178	-3.2850	-3.3450	0.0600
3	-2.8241	0.0164	-2.8000	-2.8550	0.0550
4	-2.4531	0.0154	-2.4310	-2.4810	0.0500
5	-2.1446	0.0140	-2.1240	-2.1710	0.0470
6	-1.8749	0.0127	-1.8560	-1.9000	0.0440
7	-1.6306	0.0113	-1.6140	-1.6540	0.0400
8	-1.4043	0.0099	-1.3900	-1.4260	0.0360
9	-1.1911	0.0087	-1.1780	-1.2110	0.0330
10	-0.9870	0.0076	-0.9760	-1.0050	0.0290
11	-0.7896	0.0065	-0.7800	-0.8050	0.0250
12	-0.5968	0.0056	-0.5890	-0.6100	0.0210
13	-0.4067	0.0048	-0.3990	-0.4170	0.0180
14	-0.2182	0.0046	-0.2100	-0.2260	0.0160
15	-0.0297	0.0047	-0.0220	-0.0380	0.0160
16	0.1599	0.0051	0.1680	0.1510	0.0170
17	0.3517	0.0055	0.3610	0.3430	0.0180
18	0.5470	0.0063	0.5580	0.5370	0.0210
19	0.7470	0.0072	0.7600	0.7360	0.0240
20	0.9532	0.0083	0.9680	0.9410	0.0270
21	1.1677	0.0094	1.1840	1.1550	0.0290
22	1.3925	0.0107	1.4120	1.3780	0.0340
23	1.6308	0.0116	1.6540	1.6140	0.0400
24	1.8877	0.0130	1.9150	1.8680	0.0470
25	2.1705	0.0140	2.2010	2.1490	0.0520
26	2.4915	0.0150	2.5250	2.4670	0.0580
27	2.8746	0.0161	2.9110	2.8480	0.0630
28	3.3732	0.0169	3.4120	3.3440	0.0680
29	4.1567	0.0179	4.1980	4.1260	0.0720

TABLE 2.3:8

Stability of Ability Parameter Estimates

as a Function of Sample Size (N=4000)

SCORE GROUP	MEAN	S.D.	MAXIMUM	MINIMUM	RANGE
1	-4.0893	0.0251	-4.0590	-4.1640	0.1050
2	-3.3164	0.0235	-3.2910	-3.3890	0.0980
3	-2.8293	0.0221	-2.8080	-2.9000	0.0920
4	-2.4583	0.0211	-2.4400	-2.5270	0.0870
5	-2.1497	0.0201	-2.1330	-2.2170	0.0840
6	-1.8795	0.0190	-1.8640	-1.9440	0.0800
7	-1.6353	0.0181	-1.6200	-1.6970	0.0770
8	-1.4088	0.0170	-1.3950	-1.4670	0.0720
9	-1.1951	0.0159	-1.1820	-1.2500	0.0680
10	-0.9909	0.0145	-0.9790	-1.0410	0.0620
11	-0.7931	0.0133	-0.7820	-0.8390	0.0570
12	-0.5997	0.0117	-0.5910	-0.6400	0.0490
13	-0.4093	0.0099	-0.4020	-0.4430	0.0410
14	-0.2203	0.0081	-0.2140	-0.2470	0.0330
15	-0.0312	0.0062	-0.0250	-0.0500	0.0250
16	0.1589	0.0044	0.1650	0.1480	0.0170
17	0.3513	0.0035	0.3580	0.3450	0.0130
18	0.5473	0.0040	0.5550	0.5400	0.0150
19	0.7481	0.0063	0.7660	0.7400	0.0260
20	0.9552	0.0091	0.9840	0.9470	0.0370
21	1.1704	0.0120	1.2100	1.1600	0.0500
22	1.3959	0.0150	1.4460	1.3830	0.0630
23	1.6355	0.0182	1.6970	1.6200	0.0770
24	1.8931	0.0211	1.9650	1.8750	0.0900
25	2.1767	0.0244	2.2600	2.1560	0.1040
26	2.4987	0.0272	2.5920	2.4760	0.1160
27	2.8828	0.0304	2.9870	2.8580	0.1290
28	3.3823	0.0331	3.4960	3.3560	0.1400
29	4.1669	0.0358	4.2900	4.1400	0.1500

TABLE 2.3.9

Average Stability Indexes for STEP II-Vocabulary for Calibration Situations Differing as a Function of Sample Size

	Sample Size			
	500	1000	2000	4000
Item Easiness	.1206	.0890	.0623	.0548
Ability	.0229	.0155	.0109	.0168

The consequence of the interplay of these factors is the observed difference between the stability of the easiness and ability estimates.

Even so, the amount of instability in the ability estimates is not large, even for the case of N = 500. Some perspective on this can be gained by examining Table 2.3.5 which shows the ability estimate results for samples of size 500. Notice the maximums and minimums for adjacent score groups. If these values were upper and lower bounds for "confidence intervals" they would not overlap, except in one or two cases.

To elaborate on the issue of the amount of instability, another comparison of interest is that involving the standard error of the ability estimate (error of measurement) associated with the ability parameters (i. e., from the item analyses) and these stability indexes. The standard error for the ability estimate corresponding to a raw score of 19 is about .45 regardless of the particular sample size analysis, yet the standard deviation of that estimate (score group 19, Table 2.3.5) is .013 for samples of 500. In fact the range of estimates is only .05, about 1/9 the size of the measurement error.

2.4 Stability over Occurrence in the Design

Part of the analyses requirements necessary for this project was to conduct separate item analysis of each test (vocabulary, comprehension, total reading) whenever it occurred in the design. As Table 1.3.2 shows there were 136 cells in the design matrix. Since each cell entry represents a pair of tests, one of which was administered first (i.e., according to the row index DSN number), it is possible to summarize the estimates of each item and ability parameter over their various occurrences in the design.

For example CAT, Level 3, Form A was administered in 20 cells, 10 times as a first test and 10 times as a second test. Considering the vocabulary subtest which has 40 items, the result is 20 estimates of the 40 item parameters (and ability parameters) with each estimate computed on a different sample and administered in combination with a different test. Thus, it is possible to study the stability of parameter estimates over replications in the design with some deviation in sample size, number of occurrences, test pair combinations and order of administration.

Appendix A contains Tables for each of the 14 primary form tests for vocabulary as "first tests" and "secondary tests" separately. A separate Table is also presented for item and ability estimates. The Tables contain means and standard deviations over the "replications" (occurrences).

Here, like the discussion of sample size, the standard deviation listed in the Tables provide information on stability. These "stability index" values are summarized in Table 2.4.1 and 2.4.2 for item easiness and ability respectively. According to the rationale presented in Section 2.1 on the importance of stability of parameter estimates, it follows that the data presented here is probably the best measure of the model-data fit consequences with which we are concerned.

It is interesting to observe that the value of the stability indexes for ability can be approximated by dividing the item stability index by the square root of the number of items in that test. This is rather intriguing since it implies that the stability of ability estimates can be increased by increasing the number of items (i.e., items like the ones

TABLE 2.4.1

Stability Indexes for Item Parameter Estimates for the 14 Primary Forms when the Tests were Administered First and Second

Test Name	Vocabulary		Comprehension	
	First Test	Second Test	First Test	Second Test
CAT 3-A	.1190	.1296	.1055	.1199
CAT 4-A	.0946	.1060	.0907	.0954
CTBS 2-Q	.1304	.1408	.1127	.1070
CTBS 3-Q	.0983	.1233	.0852	.0962
ITBS 10-5	.1187	.1110	.1071	.1006
ITBS 11-5	.1167	.1038	.0903	.0905
ITBS 12-5	.1065	.1083	.0887	.0956
MAT E-F	.1475	.1587	.1134	.1128
MAT I-F	.1369	.1402	.1086	.1147
STEP 4-A	.1401	.1375	.1297	.1084
SRA BL-E	.1080	.1252	.1066	.1108
SRA GR-E	.1165	.1224	.0940	.0802
SAT I-W	.1195	.1265	.1072	.0948
SAT II-W	.1440	.1430	.1081	.1048

TABLE 2.4.2.

Stability Indexes for Ability Parameter Estimates for the 14 Primary Forms when the Tests were Administered First and Second

Test Name	Vocabulary		Comprehension	
	First Test	Second Test	First Test	Second Test
CAT 3-A	.0218	.0191	.0278	.0347
CAT 4-A	.0227	.0163	.0127	.0088
CTBS 2-Q	.0246	.0270	.0188	.0138
CTBS 3-Q	.0105	.0216	.0086	.0065
ITBS 10-5	.0152	.0145	.0175	.0161
ITBS 11-5	.0131	.0084	.0134	.0105
ITBS 12-5	.0144	.0165	.0060	.0094
MAT E-F	.0374	.0442	.0275	.0240
MAT I-F	.0283	.0235	.0221	.0209
STEP 4-A	.0389	.0308	.0105	.0112
STEP BL-E	.0192	.0215	.0248	.0229
SRA GR-E	.0174	.0255	.0100	.0061
SAT I-W	.0204	.0256	.0229	.0179
SAT II-W	.0368	.0302	.0203	.0181

already included). Such a relationship is well known in test theory, and is comfortable when it is once again observed.

Another observation from the data in Table 2.4.2 is that the tests as a group are rather homegeneous with respect to these indexes. For the ability estimates, of which we are most directly concerned, the stability indexes for a test average between .01 and .04 which we can compare with the values obtained in the previous section.

2.5 Stability as a Function of Sample Composition

The two previous sections of this report have provided some indication of the degree of stability of the Rasch Model parameter estimates over samples that can be considered more or less "random", or a least nonsystematic. As such they provide information on the extent to which these estimates can be expected to vary under "unselected sampling" conditions. The results of those analyses showed that the parameter estimates have a high degree of stability and this is especially true for ability estimates on which equating depends. This section describes those anlayses which deal with stability of parameter estimates for selected subgroups of individuals identifiable by certain characteristics.

In addition to item responses, the individual student's data record contained codes for him on several demographic type variables. Among these were sex, race, IQ, grade, size of school system, and the schools' estimated percentage of students on welfare. Table 2.5.1 shows these variables, their codes and descriptions. This analysis, then, was concerned with studying the stability of parameter estimates when the samples used were homogeneous with respect to selected categories of

TABLE 2.5.1

Sample Composition Variables Codes and Descriptions

as Contained on the Anchor Test Study Data Tapes

Name	Code	Description
Sex	1	Boys
	2	Girls
	Blank	Not indicated
Race	1	Indian
	2	Negro
	3	Oriental
	4	Spanish surnamed
	5	White and others
IQ	Blank	Not indicated
	1	< 75
	2	75-89
	3	90-110
	4	111-125
	5	>125
	6	Not tested
Grade	4	Fourth
	5	Fifth
	6	Sixth
Size*	4	< 50
	8	50-99
	9	100-199
	22	200-499
	35	500-1199
	70	>1200
% Welfare**	1	None
	2	1-10%
	3	11-25%
	4	26-50%
	5	51-75%
	6	76-90%

* Measure of school system size in terms of enrollment in grades 4, 5, and 6.

** Estimate of percentage of family income provided by public welfare.

TABLE 2.5.2

Description of Sample Composition Analysis

Groups for STEP Vocabulary

Variable	Groups	Codes Used	Sample Size
Sex	Boys	1	16607
	Girls	2	16516
Race	Black	2	4759
	Spanish	4	1540
	White	5	26245
IQ	Low	1,2	4254
	Middle	3	10864
	High	4,5	8216
Grade	4	4	10865
	5	5	11182
	6	6	11076
Size	Small	4,8,9	3432
	Medium	22	20736
	Large	35,70	8955
% of P.W.	0%	1	3672
	1-10%	2	18507
	11-25%	3	5792
	20-50%	4	4155
	51-90%	5,6	997

the above variables.

The study of sample composition was divided into two parts: (1) an examination of all six sample composition variables for one test, (2) an examination of all primary form vocabulary tests on race and IQ. For the first part STEP vocabulary was chosen because of its large sample size (as mentioned in section 2.3). In each analysis, for each subgroup, ability parameter estimates were obtained and plotted. Stability indexes were also computed for the data corresponding to each of the plots.

Figures 2.5.1 through 2.5.6 (in Appendix B) show the results of these analyses for STEP vocabulary on each of the six sample composition variables. Except perhaps for IQ the results of the other five variables show practically identical ability parameter estimates.

Part two of this anlaysis involved examining each of the primary form vocabulary tests on Race and IQ. Table 2.5.3 contains the sample sizes used for each test and composition group. Following the analyses to estimate the parameters for each calibration conditions, the ability parameter estimates for each sample composition group on each test were plotted to display the degree of invariance in the parameter estimates. These results are shown as Figures 2.5.7 through 2.5.32 in Appendix B

In addition to the plots the information on stability was summarized in the form of stability indexes for each of the tests. Those data are shown in Table 2.5.4, and they indicate that there is more instability across IQ groups than across race groups. As a matter fact, whenever studies like this are conducted, where stability is observed across samples differing in composition, the variable most closely related to the latent trait being measured by the test will show the greatest

TABLE 2.5.3

Sample Sizes on each Vocabulary Test for

Sample Composition Analyses by Race and IQ

Test Name	Race			IQ		
	B	S	W	L	M	H
CAT 3-A	3226	1131	18406	3556	8755	5499
CAT 4-A	1645	549	9209	1655	4429	3181
CTBS 2-Q	4485	963	16406	3300	7895	5168
CTBS 3-Q	2281	443	8129	1654	4021	2855
ITBS 10-5	1443	635	8228	1209	3529	2491
ITBS 11-5	1513	660	8570	1385	3889	2880
ITBS 12-5	1664	593	8700	1344	4134	3020
MAT E-F	1954	500	8333	1814	4011	2309
MAT I-F	3644	985	17287	3445	8590	5258
STEP 4-A	4757	1537	25755	4252	10831	2845
STEP BL-E	4524	1321	15254	3427	6825	4224
SRA GR-E	2676	684	8561	2154	3989	2682
SAT I-W	1767	902	7540	1426	3450	1914
SAT II-W	3781	1881	15219	3349	7261	4943

TABLE 2.5.4

Ability Parameter Stability Indexes For 14 Tests Over Samples Differing In Compositions

Test Name	Stability Index	
	Race	IQ
CAT 3-A	.0577	.0983
CAT 4-A	.0943	.1596
CTBS 2-Q	.0596	.1097
CTBS 3-Q	.0562	.1111
ITBS 10-5	.0866	.1058
ITBS 11-5	.0790	.0940
ITBS 12-5	.0947	.1299
MAT E-F	.1035	.1465
MAT I-F	.1110	.1440
STEP 4-A	.1448	.1806
SRA BL-E	.0951	.1289
SRA GR-E	.1100	.1585
SAT I-W	.1397	.1947
SAT II-W	.1216	.1611

instability, as long as the test contains items with less than perfect model-data fit.

2.6 Describing Test Fit According to Certain Antecedent Conditions

In the beginning of this chapter two general approaches to describing test fit were mentioned. One was in terms of the proportion of fitting items contained in the test and the other was in terms of the achievement of those consequence conditions that the model predicts. One such consequent condition is stability, or invariance, of parameter estimates which we have discussed in the previous sections. In this section we will present various indicators of test firt in terms of item fit, and discuss their relationship with stability.

The item analysis program, MESAMAX, provides two statistics for the items that are useful in dealing with the issue of item fit. One is an index of item discrimination and is called "slope." This is a least squares estimate of the slope of item characteristic curve, after a linearizing transformation. It is based on fitting the line of regression of "percentage correct", on an ability estimate corresponding to each possible raw score. Both the raw scores and percentage correct are transformed by a log odds transformation to linearize the item characteristic curve. Thus, slope is the regression of "item log odds" on "test log odds." Theoretically, slope values should be near unity for fitting items.

Since slopes should be unity for fitting items, deviant values for items are an indicator of misfit. It seems reasonable then, that measures of dispersion of the distribution of item slopes for a test could be used as measures of test fit. In addition, it seems that the

shape of the distributions of slopes may be an important indicator of fit. Yet another way to approach a slope index of fit is to specify a criterion for fit, such as the interval $1.0 \pm .20$[5], and determine the relative number of items that meet that criterion. Table 2.6.1 presents various slope measures of fit for the 14 primary form vocabulary tests as well as the distributions of slope values.

Mean Square Fit is the MESAMAX index of fit of the item to the model. This index is a function of sample size; therefore, its interpretation must be made with care. For a particular test, the values of mean square fit might well indicate the relative fit of the various items within a test; however, mean square values probably should not be used to compare items from one test to the next nor should one attempt to interpret their absolute magnitudes.

The problem of interpreting the mean squares is a general problem in statistical hypothesis testing. The role of large samples in rejecting null hypotheses is well known. For any difference between data and an hypothesis, most statistical tests will lead to the rejection of the null hypothesis if the sample is large enough. The Rasch project samples are adequate for rejecting almost any difference as a significant departure from the model, even when the difference is of no practical consequence. For example, the mean square fits are based on the difference between expected and obtained proportions for each item-by-score group cell entry. The model specifies an expected proportion correct, p_e; while we obtain p_o. With a fairly large sample size, N we

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[5] Such an interval is consistent with previous studies that have dealt with the amount of slope deviation the model will tolerate. See Panchapakesan (1969), C. Rentz (1975).

TABLE 2.6.1

Slope Indexes of Fit and Frequency

Distributions of Slope Values for the

Primary Form Vocabulary Tests

Test Name	Slope Index[1] Q	Slope Index[1] %±.2	FREQUENCY DISTRIBUTION[2] <.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	>1.4	Number Of Items
CAT 3-A	.153	65.0	2	1	4	4	8	8	6	4	0	3	40
CAT 4-A	.227	47.5	4	1	3	7	1	4	7	4	4	5	40
CTBS 2-Q	.179	52.5	2	2	4	3	7	10	1	4	2	5	40
CTBS 3-Q	.177	50.0	1	4	3	3	7	8	2	5	3	4	40
ITBS 10-5	.116	57.8	0	4	3	2	7	9	4	4	3	2	38
ITBS 11-5	.145	62.8	1	2	3	6	6	8	7	6	1	3	43
ITBS 12-5	.214	56.5	3	1	3	9	6	7	4	4	4	5	46
MAT E-F	.146	56.0	4	2	4	3	6	12	7	6	4	2	50
MAT I-F	.161	56.0	0	5	6	9	6	6	7	5	4	2	50
STEP 4-A	.210	46.6	4	0	4	1	6	6	1	5	1	2	30
SRA BL-D	.173	57.1	2	2	1	4	8	6	6	6	1	6	42
SRA GR-E	.228	47.6	1	3	6	5	3	8	4	3	4	5	42
SAT I-W	.167	63.2	1	0	4	8	4	11	1	4	3	2	38
SAT II-W	.186	52.1	2	4	3	4	5	9	7	4	5	5	48

1 Q=the semi-interquartile range
%±.2=the percentage of items in the interval .80-1.20
2 Column heading represents upper limit of interval

probably estimate $p_o - p_e$ fairly accurately. The test is

$$z^2 = \frac{N (p_o - p_e)^2}{p_e (1-p_e)}$$

These are summed over score groups and averaged to yield the mean squares for items. Now, what if $p_o - p_e$ is estimated with great accuracy for a sample of size N, but we use an even larger sample--of size 10 N? Then clearly, z^2 will increase ten-fold.

As an index of test fit some appropriate average of the item mean squares could be used if some adjustments are made for sample size and then only if information about relative differences between tests is desired (it is doubtful that any adjustment in these indexes could make their magnitudes meaningful). Table 2.6.2 shows four such indexes based on item mean square fit values. The mean and median for each test is shown along with adjusted values in order to eliminate effects of differences in sample size. The factor (10,500/N) was used to adjust each mean and median (10,500 being the smallest sample size for the tests considered).

It is likely that as an index of test fit the item mean squares would be a defensible choice since any factor that might cause misfit would be reflected in the mean squares. The principle disadvantage of the mean squares is an interpretation of their magnitude. Cartledge (1974) used the same sample size adjustments that were used here (10,500/N) on data simulated to reflect different levels of model fit. Fit was controlled by manipulating the range of item discrimination parameters

TABLE 2.6.2

Average Item Mean Square Fit Values for

the 14 Primary Form Vocabulary Tests

Test Name	Mean	Median	Mean*	Median*
CAT 3-A	15.3	9.1	6.9	4.1
CAT 4-A	11.9	8.9	10.9	8.1
CTBS 2-Q	18.3	14.5	8.7	6.9
CTBS 3-Q	9.7	5.5	9.2	5.2
ITBS 10-5	7.0	5.0	7.0	5.0
ITBS 11-5	7.0	3.9	6.7	3.8
ITBS 12-5	8.1	4.4	7.7	4.2
MAT E-F	8.8	5.2	8.2	4.9
MAT I-F	11.6	9.8	5.4	4.6
STEP 4-A	30.0	16.8	9.7	5.4
SRA BL-E	15.5	10.0	7.5	4.8
SRA GR-E	8.2	6.3	7.1	5.4
SAT I-W	7.4	5.8	7.4	5.8
SAT II-W	12.9	9.2	6.2	4.4

*Adjusted by factor (10,500/N)

TABLE 2.6.3

Adjusted Median Mean Square Fit Values

for All Tests in the Data Base

Test Name	Vocabulary	Comprehension	Total
CAT 3-A	4.102	5.623	2.472
CAT 3-B	6.692	6.163	5.075
CAT 4-A	8.061	4.692	5.075
CAT 4-B	9.545	10.298	3.882
CTBS 2-Q	6.863	3.922	2.933
CTBS 2 R	8.467	9.166	5.916
CTBS 3-Q	5.177	3.973	3.481
CTBS 3-R	11.084	10.893	8.106
ITBS 10-5	4.984	4.670	2.768
ITBS 10-6	8.923	7.322	6.340
ITBS 11-5	3.764	2.865	2.328
ITBS 11-6	7.431	7.673	6.290
ITBS 12-5	4.163	2.685	2.244
ITBS 12-6	6.706	6.176	5.665
MAT E-F	4.943	8.527	3.897
MAT E-G	10.128	13.115	8.749
MAT I-F	4.599	6.477	3.455
MAT I-G	7.092	5.884	5.069
STEP 4-A	5.403	3.596	3.108
STEP 4-B	11.016	5.402	6.517
SRA BL-E	4.840	4.615	3.911
SRA BL-F	6.695	8.411	5.590
SRA GR-E	5.443	3.444	2.678
SRA GR-F	10.529	9.698	8.718
SAT I-W	5.795	4.609	3.134
SAT I-X	11.319	11.341	9.517
SAT II-W	4.433	2.815	2.617
SAT II-X	8.177	6.319	5.233

in the two parameter logistic model from "zero variation", and "high variation". The zero variation condition would provide a high degree of fit to the model while the high variation condition would have a low degree of fit. Her findings, of importance here, relate to the size of the average item mean squares (adjusted) since they provide us with some guidelines for interpreting the values obtained in our own work. Cartledge found average mean squares of about 15.0 over several replications of her nonfit condition and for the fit conditions the average was about 2.0. Our own values range from 5.4 to 10.9 and except for the one test whose value is 10.9, the indexes are rather homogeneous among the Vocabulary Tests. These comparisons show that these tests do not differ among themselves yet they are neither very good nor very bad fitting tests.

A comparison of the values in Table 2.6.2 indicate that the two indexes, mean and median, do not rank the tests in exactly the same order; the rank order correlation between them is 0.684. This relatively low relationship is probably due to the mean's sensitivity to peculiarities in the distribution, for example, two or three extreme values. As an index of test fit the median is probably more desirable, at least for the purposes of comparing tests. Table 2.6.3 shows the median item mean square fit index for each of the tests used in this sutdy, for vocabulary, comprehension and total reading.

2.7 Relationship of Test Fit Indexes

A variety of indexes of test fit have been presented in this chapter. Some have dealt with the extent to which the items in the tests conform to the antecedent conditions necessary for model data fit, others have dealt with the tests' achievement of specified consequent

conditions. In this section we have summarized some of the more important indexes of fit by presenting them together in Table 2.7.1 for the 14 vocabulary tests, with an indication of whether they apply to antecedent or consequent conditions.

A new index is also presented in this Table. It is an index of first factor concentration, and is labelled "% 1st Factor". The index was derived from a principle components analysis of the item intercorrelation matrices of the 14 vocabulary tests. The index is the percentage of variance accounted for by the first component.

In summary, the results of the studies reported in this chapter are not unequivocal. The 14 vocabulary tests, to which attention was concentrated showed rather moderate test fit in terms of item statistics yet acceptable performance in the studies of stability. Indeed, these tests display a high degree of homogeninity with respect to the various indexes of fit.

We had hoped that these tests would be sufficiently different so that by studying how the various indexes of model-data fit varied over this collection of tests, we could learn more about how model-data fit could be evaluated. The lack of noticably strong variance between these tests was disappointing with respect to the theoretical issues of how to evaluate model-data fit; yet, for the practical task of equating, the results were encouraging. Our conclusions about model-data fit are cautiously optimistic and they will be presented in Chapter 5.

TABLE 2.7.1

Summary of the Various Descriptive Index of Test Fit for the 14 Primary Form Vocabulary Tests[1]

Test Name	Number Of Items	Sample Size	Average Item p	Antecedent			Consequent		
				Slope Q	Mean Square Median (ADJ)	% 1st Factor	Race	Stability IQ	Occurrence[2]
CAT 3-A	40	23188	.592	.153	4.1	22.8	.058	.099	.020
CAT 4-A	40	11534	.533	.227	8.1	20.7	.094	.160	.019
CTBS 2-Q	40	22198	.616	.616	6.9	23.1	.060	.110	.026
CTBS 3-Q	40	11112	.506	.177	5.2	19.6	.056	.111	.016
ITBS 10-5	38	10503	.537	.116	5.0	21.1	.087	.106	.015
ITBS 11-5	43	10893	.559	.145	3.8	20.4	.079	.094	.011
ITBS 12-5	46	11104	.544	.214	4.2	17.5	.095	.130	.015
MAT E-F	50	11150	.680	.146	4.9	30.7	.104	.147	.041
MAT I-F	50	22367	.607	.161	4.6	25.1	.111	.144	.026
STEP 4-A	30	32623	.658	.210	5.4	23.0	.145	.181	.035
SRA BL-E	42	21664	.556	.173	4.8	30.3	.095	.129	.020
SRA GR-E	42	12170	.573	.228	5.4	21.1	.110	.158	.021
SAT I-W	38	10524	.470	.167	5.8	19.4	.140	.195	.023
SAT II-W	48	21760	.455	.186	4.4	17.4	.122	.161	.034

[1] The only table value not previously presented and discussed is "average item p". This is the mean item difficulty (proportion answering the item correctly).

[2] Averaged over first and second administrations (see Table 2.4.2)

Chapter 3

Equating Methodology

The purpose of this section is to present techniques and results for equating and estimating equating errors. We will present our general logic and our specific techniques, as well as some sample data; however, first we should consider general principles in Rasch equating.

3.1 General Principles

There are two basic references for consideration in regard to fundamental logic. Angoff, in Thorndike's Educational Measurement, presents the various experimental designs that one might employ to equate two tests. He also presents details of equipercentile and linear equating. The general logic and procedures of Rasch equating is in the dissertation of Nargis Panchapakesan (1969).

We define "equivalent scores" as scores that correspond to the same Rasch ability. Our definition is similar to the usual definition of equivalent scores -- "Two scores ...may be considered equivalent if their corresponding percentile ranks in any given group are equal". (Angoff, W. H. In Thorndike, R. L., Educational Measurement, p. 563).

In order to apply this definition, ability scales for tests to be equated must be comparable. Thus, prior to actual raw score-to-raw score equating, each test must be calibrated on the same scale.

A distinction between "calibration" and "equating" is helpful for clarification. Angoff (1971, p. 565) has pointed out the need for this

distinction. "Calibration" refers to the assignment of abilities to raw scores, whereas "equating" refers to the determination of equivalent raw scores.

The next section outlines the procedures for determining equating constants. These constants are used to calibrate all tests on a common scale. After this calibration is completed, then raw score-to-raw score equating is accomplished by applying the definition stated previously.

There are two general equating procedures developed to conform to Rasch theory. Both yield a single additive constant for a test pair. This constant adjusts the ability scale on one test to that of another.

We refer to one as the "ability method". In this technique, the test pair is administered to a single group of persons. Each test in the pair is analyzed separately by a Rasch analysis. Since the group's ability is not different on the two tests, any perceived difference in average ability must be due to the differences in scale origin on the two tests. The appropriate equating constant is the difference in the ability averages. One of the pair is chosen as a reference test. The constant is applied to the second test to adjust its scoring table to conform to that of the reference test.

The second equating procedure we call the "difficulty method". The difficulty method is based on a Rasch analysis of both tests combined into one long test. If the two tests in the pair have the same scale origin, then the averages of log easiness for both tests will be equal. To the degree that these averages are not equal, the two tests separately have scale origin differences. The equating constant is the difference in average log easiness. This constant is added to the abilities generated by one of the tests to put this test on the same

scale as the other test.

The equating methodology to be described in the following section is not dependent on whether the "ability" or "difficulty" method is chosen. In either choice, the differences obtained are the basic data for following the procedures for obtaining the final recommended equating constants.

Equating constants based on both methods were determined. However, the results of the difficulty method are stressed and recommended. This choice is largely based on the assumption that these results are more stable. The expected stabilization occurs through the analysis of the combined test data in the difficulty method. The combined data analysis should yield results based on a commonly measured trait. On the other hand, the ability method requires separate analyses of each test. These separate analyses lead to a need to depend entirely on an assumption of equivalence. However, both methods theoretically lead to the same results, so the choice is somewhat arbitrary. Standard errors of equating constants are also expected to be similar. This similarity is discussed more fully later in this chapter.

STEP vocabulary was chosen as the reference test for all equatings. STEP was chosen because it has a single level which was given at all grades, and thus was paired with all other tests studied. Tables are presented in this report in which each test is equated into all other tests, but equating was conducted using STEP to define the origin of the calibrated scales of all tests. The choice of a reference test is arbitrary as only additive constants are involved.

3.2 Estimating Equatings Constants: Methodology and Results

In order to avoid irregularities due to sampling in the individual sets of data, constants are based on averages over several sets of data. These calculations will be explained in detail. Throughout this section, the difficulty method is employed, so no distinction is made between ability or difficulty adjustments.

Data were analyzed by level and form without regard to grade level. However, equating constants were developed by grade level. For example, if a particular test was designed for both the fourth and fifth grades, then we did not separate the data for this test by grade. Data from both grades entered into the calculations of fourth grade equating constants and fifth grade equating constants. After determining both constants, averages over the grades were calculated, where appropriate.

For a particular test pair, data on both tests were calibrated treating the tests as one long test. The combined analysis yields easiness estimates for each item in both tests. The average of the easiness was determined for each of the two tests in these combined-test analyses. A difference in these averages was calculated for each test pair.

The average differences for primary forms equatings were organized into 7 x 7 matrices. There were six of these 7 x 7 matrices: namely, vocabulary tests at each of three grade levels and comprehension tests at each of three grade levels.

The 7 x 7 difference matrices included zeros on the diagonals, as parallel forms adjustments were determined separately from test-to-test adjustments. The seven rows and columns each correspond to one of the test batteries. The matrix entries above the diagonals are the log

easiness average differences between the test pair when the pair was administered in one of the orders of testing. The entries below the diagonals were based on the data obtained in the other order of testing. These differences matrices are presented in Tables 3.2.1 to 3.2.6. Each difference in each table is calculated by subtracting the average easiness of the test identified by the column heading from the average easiness of the test identified by the row heading.

Our final recommended results followed the procedure to be discussed only for equating vocabulary tests. The 7 x 7 matrices were used to equate comprehension tests, but the results were not our recommended ones. The reasons for this change in procedure will be given subsequently. The 7 x 7 matrices for comprehension are presented here partly because they do yield valid equating constants, but primarily because they provide basic data for readers who wish to compare the difficulty of various reading comprehension tests.

The analysis proceeded by calculating row and column means. The zero diagonal values are included in the calculation of these means as these correspond to the difference between a test and itself. (Differences between the column mean vector and the row mean vector are due to order-of-testing effects and sample differences.

The remaining calculations can be illustrated by example. Consider the first table--fourth grade vocabulary. The marginal means are presented below.

Test	1	2	3	4	5	6	7
Row Means	-.219	.093	-.172	.892	.142	-.143	-.444
Column	.222	-.026	.239	-.853	-.042	.160	.449

TABLE 3.2.1: FOURTH GRADE VOCABULARY DIFFERENCE MATRIX

TEST	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT	MEAN
1	0.	-.258	.004	-1.171	-.246	-.053	.190	-.219
2	.293	0.	.288	-.786	.070	.215	.572	.093
3	.031	-.299	0.	-1.022	-.256	.087	.256	-.172
4	1.155	.863	1.081	0.	.928	.924	1.290	.892
5	.313	.138	.443	-.769	0.	.293	.576	.142
6	.011	-.188	.063	-.929	-.211	0.	.256	-.143
7	-.250	-.438	-.204	-1.294	-.578	-.346	0.	-.444
MEAN	.222	-.026	.239	-.853	-.042	.160	.449	.021

TABLE 3.2.2: FIFTH GRADE VOCABULARY DIFFERENCE MATRIX

TEST	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT	MEAN
1	0.	-.258	.712	.419	-.246	-.053	1.212	.255
2	.293	0.	.809	.633	.070	.215	1.652	.525
3	-.602	-.707	0.	-.114	-.737	-.499	.758	-.272
4	-.450	-.502	.217	0.	-.482	-.347	.849	-.102
5	.313	.138	.917	.673	0.	.293	1.372	.529
6	.011	-.188	.568	.437	-.211	0.	1.222	.263
7	-1.439	-1.592	-.922	-.851	-1.438	-1.266	0.	-1.072
MEAN	-.268	-.444	.329	.171	-.435	-.237	1.009	.018

TABLE 3.2.3: SIXTH GRADE VOCABULARY DIFFERENCE MATRIX

TEST	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT	MEAN
1	0.	.007	-.029	-.867	-1.522	-.486	-.021	-.417
2	-.025	0.	-.104	-.896	-1.284	-.421	-.021	-.390
3	.042	.115	0.	-.763	-1.361	-.338	.056	-.321
4	.956	.900	.854	0.	-.482	.356	.849	.491
5	1.544	1.611	1.528	.673	0.	1.082	1.372	1.116
6	.506	.482	.368	-.413	-.958	0.	.466	.064
7	-.015	.073	-.048	-.851	-1.438	-.429	0.	-.387
MEAN	.430	.455	.367	-.445	-1.006	-.034	.389	.022

TABLE 3.2.4: FOURTH GRADE COMPREHENSION DIFFERENCE MATRIX

TEST	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT	MEAN
1	0.	-.063	.276	-.402	.364	.312	.320	.115
2	.262	0.	.399	-.269	.478	.446	.435	.250
3	-.145	-.351	0.	-.713	.113	.063	.031	-.143
4	.625	.516	.784	0.	.874	.630	.801	.604
5	-.281	-.383	.050	-.751	0.	-.055	.006	-.202
6	-.127	-.271	.149	-.533	.127	0.	.074	-.083
7	-.092	-.298	.116	-.503	.055	.022	0.	-.100
MEAN	.035	-.122	.253	-.453	.287	.203	.238	.063

TABLE 3.2.5: FIFTH GRADE COMPREHENSION DIFFERENCE MATRIX

TEST	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT	MEAN
1	0.	-.063	.771	.485	.364	.312	.906	.396
2	.262	0.	.818	.552	.478	.446	1.063	.517
3	-.568	-.721	0.	-.197	-.164	-.332	.251	-.247
4	-.244	-.340	.295	0.	.186	-.047	.529	.054
5	-.281	-.383	.355	.064	0.	-.055	.508	.030
6	-.127	-.271	.494	.226	.126	0.	.636	.155
7	-.740	-.873	-.153	-.354	-.406	-.480	0.	-.429
MEAN	-.243	-.379	.369	.111	.084	-.022	.556	.068

TABLE 3.2.6: SIXTH GRADE COMPREHENSION DIFFERENCE MATRIX

TEST	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT	MEAN
1	0.	-.180	.184	-.710	-.665	-.308	-.249	-.275
2	.407	0.	.433	-.397	-.316	.042	-.048	.017
3	-.024	-.313	0.	-.834	-.714	-.434	-.441	-.394
4	.893	.585	1.020	0.	.186	.462	.529	.525
5	.897	.574	.916	.064	0.	.477	.508	.491
6	.494	.060	.531	-.443	-.308	0.	.095	.061
7	.461	.198	.581	-.354	-.406	.152	0.	.090
MEAN	.447	.132	.524	-.382	-.317	.056	.056	.074

The signs of corresponding numbers differ since they correspond to reverse orders of test administration, and, therefore, to reverse orders of subtraction. The -.219 and the +.222 both mean that the average easiness of test 1 is lesser than the overall average easiness. That is, test 1 is more difficult than the average.

The row and column means are averaged to get an adjustment averaged over testing order. This averaging is accomplished by changing the sign of the row means prior to averaging. We get the following averages:

Test	1	2	3	4	5	6	7
Averages	.221	-.059	.206	-.872	-.092	.151	.447

All tests are put on the STEP scale by adding .092 to each average (test 5 is STEP). This correction puts all tests on one scale with an origin defined by the STEP origin. We obtain the following set of equating constants:

Test	1	2	3	4	5	6	7
Constants	.313	.033	.298	-.780	0	.243	.539

The process is repeated for grades five and six. The constants at this point are presented in Tables 3.2.7 and 3.2.8. The next adjustment was to average constants for tests that were administered at more than one grade level. These averaged coefficients appear between the values used to compute the averages and are underlined. The ".313" means that test 1 is harder than STEP by .313 log units. Thus, we adjust test 1 by adding .313 to each of its stability estimates to put each on the STEP scale.

The next step is to obtain equating constants for parallel (secondary) forms to get these tests on the same scale as the primary forms. This

TABLE 3.2.7: A SET OF EQUATING CONSTANTS FOR VOCABULARY*

GRADE	TEST						
	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT
4	.313	.033	.298	-.780	0	.243	.539
	.267	.016				.238	
5	.221	-.002	.782	.619	0	.232	1.523
				.606			1.486
6	1.484	1.489	1.405	.593	0	1.013	1.450

* Underlined numbers are the averages of the numbers immediately above and below them. Averages are calculated when a test is used at two grade levels.

TABLE 3.2.8: A SET OF EQUATING CONSTANTS FOR COMPREHENSION*

GRADE	TEST						
	1 CAT	2 CTBS	3 ITBS	4 MAT	5 STEP	6 SRA	7 SAT
4	-.285	-.431	-.046	-.773	0	-.101	-.075
	-.315	-.453				-.108	
5	-.346	-.475	+.281	+.002	0	-.116	+.446
				-.024			+.427
6	+.765	+.461	+.863	-.050	0	+.401	+.387

* Underlined numbers are the averages of the numbers immediately above and below them. Averages are calculated when a test is used at two grade levels.

step consists of adding an appropriate log easiness mean difference to the primary form equating constant. Data were obtained for each secondary form in only two data sets. That is, secondary forms were paired with their respective primary form for two orders of testing. Thus, each secondary form equating constant consists of adding to the primary form equating constants the average of the mean easiness difference found in the two data sets.

The comprehension test equating now needs to be explained. If we were to use the results of the six 7 x 7 tables for bringing comprehension onto the STEP vocabulary scale, then it would be accomplished by adding to each comprehension equating constant the value .799. This number is the difference in average easiness for STEP vocabulary and comprehension items when these items are calibrated together on a total test analysis. It reflects the fact that comprehension is more difficult than vocabulary on STEP.

This procedure was not used, however, in our final product. The result of the +.799 adjustment would be to slide all comprehension tests the same amount without regard to their respective vocabulary test. It was our opinion that battery-by-battery adjustments would be superior in that the relationship between vocabulary and comprehension would be maintained for each battery. Therefore, comprehension was adjusted to vocabulary for each test using the same procedure that was used to find parallel forms equating constants. This had the added benefit of allowing ajustments to be made on the basis of all data added together (our base files), rather than on the basis of the three 7 x 7 matrices, since vocabulary and comprehension pairs were always administered together.

Our Final result is presented in Table 3.2.9. This table presents the equating constants that were recommend

3.3 Raw Score Equating

The coefficients in Table 3.2.9 were entered into our equating program to yield raw score equating tables. (These are included in Appendix C & D). The logic of the equating procedure follows. Let B_i be the raw scores on the base test. Let A_{bi} be the corresponding abilities in the base test scoring table after equating adjustments. Let C_j be the raw scores on the test to be equated to the base test, and let A_{cj} be the corresponding abilities in the scoring table of this test after equating adjustments. Then for each possible score B_i on the base test, we find the score C_j on the test to be equated such that

$$A_{bi} - A_{cj}$$

is a minimum. The score, C_j, that minimizes $A_{bi} - A_{cj}$ is the equivalent score of B_i.

3.4 Error Problems

We recognize several sources of error entering into the application of equating tables. The major source of error is test unreliability. This particular error source appears to be much more severe than other error sources and is usually on the order of .3 of a log unit. That is to say, the standard error of measurement for these tests is between 2.5 and 3.5 raw score units which is usually about .3 log ability units. Moreover, conditional raw score standard deviations for equated tests

TABLE 3.2.9: EQUATING CONSTANTS RECOMMENDED FOR USE*

TEST DSN	TEST NAME	VOCABULARY	COMPREHENSION	TOTAL
1	CAT3A	+.267	+.437	+.354
2	CAT3B	-.181	-.067	-.123
3	CAT4A	+1.484	+1.732	+1.615
4	CAT4B	+1.139	+.814	+.967
5	CTBS2Q	+.016	+.262	+.146
6	CTBS2R	-.508	-.598	-.556
7	CTBS3Q	+1.489	+1.437	+.906
8	CTBS3R	+1.294	+.985	+1.130
9	ITBS10-5	+.298	+.664	+.533
10	ITBS10-6	+.249	+.369	+.326
11	ITBS11-5	+.782	+1.126	+1.000
12	ITBS11-6	+.530	+.499	+.510
13	ITBS12-5	+1.405	+1.859	+1.688
14	ITBS12-6	+1.283	+1.415	+1.365
15	MATEF	-.780	-.172	-.492
16	MATEG	-.892	-.199	-.564
17	MATIF	+.606	+.802	+.699
18	MATIG	+.580	+.762	+.666
19	STEP4A	0	+.799	+.399
20	STEP4B	-.152	+.510	-.066
21	SRABE	+.238	+.506	+.381
22	SRABF	-.137	-.161	-.150

TABLE 3.2.9: EQUATING CONSTANTS RECOMMENDED FOR USE*
(continued)

TEST DSN	TEST NAME	VOCABULARY	COMPREHENSION	TOTAL
23	SRA	+1.013	+1.348	+1.192
24	SRAGF	+.745	+.510	+.620
25	SATIW	+.539	+.591	+.571
26	SATIX	+.439	+.495	+.473
27	SATIIW	+1.486	+1.618	+1.411
28	SATIIX	+1.638	+1.663	+1.652

* The equating constant for a test is to be added to all abilities estimated from that test to yield abilities on a scale the origin of which is the origin of STEP 4A Vocabulary.

are in the range of three to six raw score points.

There is some instability in the equating constants themselves. This error source is minor, and is of the order .02 of a log ability unit. This error source will be developed fully in the last section of this chapter.

A third type of instability is in the assignment of abilities to raw scores. This is a major problem and called "stability of Rasch ability parameter estimates." Chapter 2 of this report dealt specifically with demonstrating this stability over various sample sizes and sample compositions. Our conclusions drawn from Chapter 2 was that sufficient stability is present over types of data sets to allow confidence in the equating results.

There is a fourth error source of importance that we choose to call "assignment error". This is the error associated with assigning a raw score on one test as equivalent to raw score on another test. If we were reporting all scores on a common log ability scale, then there would be no assignment error. Assignment error occurs by having to assign a child a raw score on an equated test that is most equivalent to a raw score on a base test. A hypothetical example follows. Consider this partial table.

LOG ABILITY	BASE TEST	EQUATED TEST
-3.2	10	
-3.0		10
-2.8		
-2.6	9	9
-2.4	8	8

A child who receives a 10 on the base test should be given an ability of -3.2. This estimate would contain error of measurement and a slight

error of estimating the equating constant. However, he must be assigned an equated test raw score of 10, since this equated test score most clearly estimates his ability. His assignment error is .2 due to the need to assign a raw score. Tables of assignment errors corresponding to each equating table are presented in Appendix E and F.

It is our opinion that the instability of equating constants is inconsequential. Assignment errors are not inconsequential, but are not overly severe. Scoring table stability is also not inconsequential. Such stability follows from designing tests that meet the assumptions of the Rasch model, or by demonstrating empirically sufficient stability for existing tests as we did in Chapter 2. The major source of error will remain the usual instability of the individual raw score. The assignment error can be avoided by not using raw score-to-raw score equating, but the calibrating raw scores to an ability scale common to all instruments. This latter alternative we have provided in the form of our "National Reference Scale", presented in Volume II of this report.

The final section of this presentation is a developement of equating constant error estimation procedures. This final section will demonstrate that assignment error and the usual measurement error are the error sources of real concern.

3.5 Vocabulary Constant Error Variance

Estimates of equating constant standard errors are based on the standard errors of easinesses. The easiness standard errors are combined using the usual addition of uncorrelated variances formula

$$V(\Sigma a_i x_i) = \Sigma a_i^2 V(x_i).$$

The procedure to be outlined can be modified for any equating design (including ability equating), but this discussion will follow our difficulty equating design involving the 7 x 7 difference matrices.

Let d_i be the easiness estimates and $V(d_i)$ be the corresponding variances from the Wright-Panchapakesan analyses. We start equating by averaging the d_i's to yield d.'s for each test in each of the cells in the 7 x 7 matrix. The variance of d. is

$$V(d.) = \frac{1}{k^2} \Sigma V(d_i);$$

where k is the number of items. There are two d.'s in each cell of the matrix. The difference between these two d.'s has a variance

$$V(d._1 - d._2) = \frac{\Sigma V(d_i)}{k_1^2} + \frac{\Sigma V(d_j)}{k_2^2}$$

Denote each of these values by V_{ij}, where the subscripts indicate the cell in the 7 x 7 matrix. (Note: The diagonals of these matrices are empty. Parallel forms constants are treated separately.) We now obtain row and column averages parallel to our averaging process in the

equating procedure.

$$\text{Row average variance} = \frac{1}{49} \sum_{j=1}^{7} V_{ij} = V_{i\cdot}$$

$$\text{Column average variance} = \frac{1}{49} \sum_{j=1}^{7} V_{ij} = V_{\cdot j}$$

Following a change of sign of one of the sets of marginal averages, the corresponding row and column values are averaged. The variances of these averages are

$$V_j = \frac{1}{4} (V_{j\cdot} + V_{\cdot j}), \; j = 1, \ldots, 7.$$

One of the V_j corresponds to the reference test STEP. The STEP constant is subtracted from each of the other constants to yield equating constants. The variance of these constants is

$$V_j^* = V_j + V_{STEP}$$

The reader will note from this result that the decision to reference scales on STEP introduces a small, but unnecessary source of variation. That is, one does not need to choose a reference test, but could choose the overall average origin. If this latter choice is made, then V_j instead of V_j^* would be the solution at this point.

Some equating constants are averaged over two grades (in cases in which a level is used in more than one grade). In these cases the two V_j^*'s are added and the sum is divided by four. STEP has only one form

which is used in three grades. These three V^*_{STEP} 's are added and the sum is divided by nine.

The general solution just presented involves the assumptions that the standard errors of easinesses are reasonably accurate, that the items are locally independent, and that the groups of examinees in the 7 x 7 matrix design are experimentally independent. These independence conditions are not strictly met, since cell entries are used in both row and column averaging and some data appear in more than one 7 x 7 matrix. This failure to achieve full independence of terms is not seen as affecting numerical values greatly; therefore, calculations are carried out as if all terms are experimentally independent.

The input data, the easiness standard errors, will normally be obtained from the Wright-Panchapakesan analysis. However, they can be obtained from direct empirical techniques as was done in Chapter 2.

3.6 Parallel Forms Constants Error Variances

Standard errors for parallel forms constants are based on two-sample studies. We have a V_{12} and a V_{21}, corresponding to the two orders of administration. The two pairs of mean easinesses are averaged, which corresponds to the variance of

$$\frac{1}{4}\ (V_{12} + V_{21})$$

for each of seven parallel forms. A final equating constant consists of adding the parallel form constant to the primary form constant to yield a final variance of

$$V^*_j + \frac{1}{4}\ (V_{12} + V_{21}),$$

where the subscript j is omitted from the right hand term.

3.7 Comprehension Constant Error Variances

Comprehension equating constants can be estimated in the same manner as vocabulary equating constants. If the comprehension equating constants are estimated in that way, then error variances can be estimated in the manner previously described. However, comprehension constants were estimated by base file comprehension-vocabulary average difficulty differences. Thus, the procedure used all data on a particular test-form-level combination. The adjustments are the differences in averages of difficulties between vocabulary items and difficulty items when total tests are calibrated. The error variance of this adjustment is

$$V_{v\text{-}c} = \frac{\Sigma V(d_i)}{k_v^2} + \frac{\Sigma V(d_i)}{k_c^2}$$

A simple summation of the $V(d_i)$ over all items would not reflect differences in lengths of the two subtests.

The v-c difference is added to the vocabulary constant to yield the comprehension equating constant on the STEP vocabulary scale. Thus, final error variances for comprehension equating constants are the sums of the corresponding $V_{v\text{-}c}$ and V_j^*.

3.8 Crude Estimates of Error Variances

The variance of the easiness of item i is approximately

$$V(d_i) \simeq \left[\sum_{j=1}^{N} p_{ij}q_{ij} \right]^{-1}$$, where N is the sample size.

Since p and q range from 0 to 1 and p + q = 1, the values of pq do not vary much. Almost all pq values will be in the range of 1/9 to 1/4. If we denote by c the average value of $(pq)^{-1}$, then c can be

estimated crudely to be in the range of 4 to 9. Therefore, we can estimate $V(d_i)$ quite reasonably to be c/N, where $4<c<9$.

For example, p's usually exceed .13. For p = .13, pq = .11 and c = 9. The maximum p is .5, or pq = .25. For the maximum p, then, c = 4. Thus, we obtain

$$V(d_i) = c/N$$

Then $V(d.) = \frac{1}{k^2}(kc/N) = c/kN.$

And $V_{ij} = \frac{2c}{kN_{ij}}$ or, if the k's are not equal,

$$V_{ij} = \frac{c}{N_{ij}}\left(\frac{1}{k_i} + \frac{1}{k_j}\right).$$

The row and column values $V_{i.}$ and $V_{.j}$ are

$$V_{i.} = \left(\frac{c}{49}\right)\sum_{i\neq j}^{7}\frac{1}{N_{ij}}\left(\frac{1}{k_i} + \frac{1}{k_j}\right)$$

and similarly for $V_{.j}$.

Finally, we would have V_j and $V_j + V_{STEP}$ to calculate.

If we take reasonable estimates of c, k, and N, we can get reasonable estimates of the equating constant standard errors on the average. Take k = 40 and N = 750 for all instances, and c = 9 to yield overestimates of the standard errors of easinesses.

We have $V(d_i) = 9/750 = .012$, and

$$V(d_.) = 9/(40)(750) = .0003$$

Each V_{ij} is $(9/750)(2/40) = .0006$

$$\text{And } V_{.j} = \frac{9}{49} \sum_{i \neq j} \frac{1}{750} \left(\frac{2}{40} \right)$$

$$= \frac{6}{49} (.0006) = .0000735$$

Also $V_{i.} = .0000735$

$$V_j = \frac{1}{4} 2 (.0000735) = .0000367$$

And the variance of an equating constant is

$$V_j + V_{STEP} = .0000735$$

yielding a standard error crude estimate of .0086.

Since c = 9 is conservative, we can take .01 as a reasonable estimate of the standard error of a vocabulary primary form equating constant.

3.9 Results of Applying Equations

The Vocabulary equating constants standard errors were estimated by the procedures outlined. The following table (Table 3.9.1 shows these standard errors for all primary and secondary Vocabulary tests.

Table 3.9.1 shows that the formula estimates of the standard errors of primary forms (odd numbered DSN's) are all less than the crude estimate of .0086.

TABLE 3.9.1: VOCABULARY EQUATING CONSTANTS STANDARD ERRORS

TEST NAME	SE	TEST NAME	SE
CAT 3-A	.0046	MAT E-F	.0071
CAT 4-A	.0057	MAT E-G	.0090
CTBS 2-Q	.0076	MAT I-F	.0048
CTBS 3-Q	.0089	MAT I-G	.0059
ITBS 10-5	.0046	STEP 4-A	.0042
ITBS 11-5	.0059	STEP 4-B	.0059
ITBS 12-5	.0075	SRA B-E	.0045
MAT E-F	.0091	SRA B-F	.0057
MAT I-F	.0073	SRA G-E	.0073
STEP 4-A	.0085	SRA G-F	.0090
SRA BL-E	.0069	SAT I-W	.0071
SRA GR-E	.0080	SAT I-X	.0094
SAT I-W	.0076	SAT II-W	.0048
SAT II-W	.0086	SAT II-X	.0060

The secondary forms (even numbered DSN's), also yield formula standard errors considerably smaller than the crude estimates. The crude estimates of parallel forms equating constant error variances are

$$.0000734 + \frac{2}{4}(.0006) = .000373,$$

yielding standard errors of .019, or approximately .02. The formula estimates are all below .01, but each is somewhat larger than its corresponding primary form constant.

3.10 Comments on Errors

The basic data for standard error equatings are the easiness standard errors from the original Rasch analyses. Empirical standard errors, obtained by calculating easinesses on multiple samples, yield similar results. Thus, it is apparent that the error sources of concern are the usual measurement errors and assignment errors. However, assignment errors can be avoided by using the reference scale.

3.11 Equating Errors for the Ability Method

The arbitrariness of choosing the difficulty method over the ability method is further documented by comparing the squared standard errors of ability and easiness parameters. Both squared standard errors are of the same form (Wright and Douglas, undated, pp. 4-7):

$$(\Sigma p_{ij} q_{ij})^{-1}$$

For easinesses, the sum is taken over persons; whereas, for abilities, the sum is taken over items. In either case, we can use the estimates previously discussed. Take $4 < c < 9$ as a reasonable set of estimates of the average of $(pq)^{-1}$.

Thus, the error variance for an item is estimated to be c/N. Whereas, the error variance for an ability is estimated roughly to be c/k, where k is the number of items on one of the tests. The determination of equating constants begins by averaging the easinesses within each set of items or by averaging the abilities. In the difficulty method we get c/Nk_1 and c/Nk_2 for the crude estimates or the error variances of the two averages that are used to calculate initial entries in the 7 x 7 tables. However, these values are identical to what we get for crude estimates of the error variances for mean ability. Both error variances are functions of N, k_1, and k_2. The crude estimates differ only in the order of operations.

Chapter 4

Equipercentile and the Rasch Model: A Comparison of the Results

This chapter is concerned with the similarity of results of the equating of nonparallel tests which were produced by the Equating Phase of the Anchor Test Study and by the use of Rasch Model techniques presented in the last chapter. The topics considered briefly here are the differences in the methodologies used in the two studies, the differences in data organization and the presentation of the results, some empirical comparisons based on selected subsamples of the data, and a few conclusions derived from this attempt at comparison.

4.1 The Methodologies

Scores on two tests can be defined as equivalent in many different ways - each method providing a way of converting the system of units of one form to the system of units of the other so that scores derived from the two forms after conversion will be directly equivalent.

The results of the equating of reading achievement tests have been produced by three equating procedures: linear, equipercentile, and Rasch. The linear definition of equating is that two raw scores are equivalent if they are the same number of standard deviation units above or below the means of their respective score distributions. The linear method of equating assumes that two distributions of scores have the same basic shape and differ only in their means and variances. Linear

equating is a very close approximation to equipercentile equating when the shapes of the raw score distributions are similar; therefore, if one is prepared to assume that differences in the shapes of the distributions of raw scores o wo forms are sufficiently trivial so that they may be disregarded, linear equating may be preferable. Unlike equipercentile equating, it is e irely analytical and verifiable and is free from any errors of smoothing, which can produce serious errors in the score range in which the data are scant and/or erratic.

The equipercentile definition of equating is that two raw scores are equivalent if their percentile ranks are equal. One way of insuring equivalent scores when the distribution shapes are different is to equate by equipercentile methods. Generally, the conversion of X scores to their equivalent Y scores will be curvilinear, and under such circumstances the equivalency is established by stretching and compressing the raw score scale of one of the forms so that its distribution will conform to the shape given by the other form.

The equating of tests using Rasch theory has been explained in the previous chapter. In this procedure, two test scores are defined as equivalent if they give rise to the same ability estimates. Raw score equating is accomplished by assigning as equivalent that pair of scores (from two tests) for which the ability scale difference is a minimum. Since the ability scales resulting from the test calibration process have equivalent scale units, only scale origin adjustments are necessary to bring the two sets of abilities into a common scale. Rasch equating consists mainly of estimating these adjustments (equating constants).

In the Equating Phase of the Anchor Test Study, two equating methods were used. One technical objective of the Equating Phase was to compare the equating tables that resulted from the linear equating method and the equipercentile method. Between the two, the equipercentile method was judged to be best. One reason for this judgement was that the linear method resulted in impossible score values such as negative scores or scores that exceeded the number of items in the subtest.

The equipercentile method was applied by a technique developed by Lord for using all data on a given test. This technique is somewhat analogous to our procedure for combining data across various samples. Lord's technique was applied twice for each base test depending on whether the base test was administered first or second. These two equatings yielded nearly identical results and the resulting two equating tables were averaged. This procedure, explained fully in the Anchor Test Study report, is their recommended procedure. For this reason, in making the comparisons included here, only their recommended results were used.

4.2 Data Organizations and the Presentations of the Equating Results

The primary results of the Equating Phase of the ATS were tables for equating each of the seven reading tests to each of the other six tests. Results were presented separately for grades 4, 5, and 6. This series of equating tables makes it possible to translate a child's score on any of the seven tests into an equivalent score on any of the other tests appropriate for his grade level. Thus, results from each grade are presented separately.

In the Rasch equating study, the seven tests were considered as twenty-eight tests by separating them into their various forms and levels. STEP having only one level, ITBS having three levels, and the other five batteries each having two levels yields fourteen primary and secondary forms. The Rasch results are presented with each of the fourteen primary forms used as a base test with its secondary form and the other thirteen primary forms being equated to it. Therefore, fourteen equating tables are presented, each showing the raw scores for the base test plus the equated raw scores for its secondary forms and the other thirteen primary forms.

Two major differences in the results of the two studies are obvious. First, the ITBS results are presented by grade with equated scores shown for the first seven test forms appropriate for each grade level. The results of the Rasch study provide equated scores for each of the fourteen primary forms. A second major difference in the equating results is that raw score equatings for each test with its secondary form is presented only in the results of the Rasch study.[6]

4.3 Comparison of the Results

In order to compare the results of the two studies, the following procedures were used. Various subsamples were identified such that they were composed only of those subjects who were administered a pair of tests in a specified order. For example, one of these subsamples was persons who were first administered CAT Level 4 Form A and then admin-

[6] It might strike the reader as peculiar that equation of secondary forms is necessary; yet, there were tests in the data base whose secondary forms were sufficiently different in difficulty from their primary forms that they could not be considered parallel.

istered ITBS Level 12 Form 5. For each selected subsample, the first test administered was treated as the base test. For each raw score on the base test a conditional mean, the raw score equivalent scores determined by ATS, and the raw score equivalent scores determined by the Rasch project provide three different estimates of an equated score. Conditional mean square residuals from each estimate were calculated. Tables 4.3.1 through 4.3.9 provide examples of these comparisons. Also, the distributions of scores on the base test are presented so that the reader will know what the conditional sample sizes are. The conditional mean squares are not calculated for conditional sample sizes of fewer than five.

The first table presents a test pair both of which fit the Rasch model fairly well. The tests included in Table 4.3.1 were given to and designed for fourth graders only. The sample included 916 subjects who were given the SAT Intermediate I Form W and then the ITBS Level 10 Form 5. These two tests have 63.2% and 57.8% of their respective slopes between .8 and 1.2. The estimated results from the equating studies differ at the most by two raw score points with most of these differences in the lower half of the raw score scale. The root mean squares for the upper half of the distribution are equal in most cases; however, these values in the lower part of the distribution are smaller for the root mean squares based on the equipercentile results.

The tests included in Table 4.3.2 were given to and designed for fourth graders only, also. The sample included 719 subjects who were first given the MAT Elementary Form F and then the SAT Intermediate I Form W. This analysis was made to show the comparison using the MAT,

the test used as the Anchor Test in the ATS, and a test defined as a test of good fit in relation to the Rasch Model. The estimated results from the equating studies differ by, at the most, three raw score points with most of the differences in the second half of the raw score scale. The root mean squares in this example are equal at only six points in the raw score scale; therefore, the values of the Rasch root mean squares and the equipercentile root mean squares differ throughout the remainder of the distribution with the equipercentile values usually being smaller but by varying amounts.

The tests included in Table 4.3.3 are MAT Elementary Form F and SRA Blue Form E administered in that order to a sample of 871. Although this SRA test was designed for grades four and five, in this administration only fourth graders were involved because of its being paired with the indicated level of MAT. Hence, fourth grade equipercentile procedures differ in this analysis by as much as four raw score points in the second half of the distribution. The Rasch root mean squares are usually larger throughout the analysis with the greatest differences in these values found in the last one-third of the distribution.

In Tables 4.3.4 and 4.3.5, the tests involved were the SAT Intermediate II Form W and MAT Intermediate Form F. Both of these tests were designed for both grades five and six. Therefore, in this comparison using 1241 subjects, Table 4.3.4 shows the analysis using the fifth grade equipercentile results and Table 4.3.5 shows the analysis using the sixth grade equipercentile results. Conditional means and Rasch equating tables are identical in both tables. The differences in the raw score estimates using the Rasch results and the equipercentile results

for the fifth grade are never more than one raw score point. The sixth grade comparison using the equipercentile results differ at some points with the Rasch estimates by two raw score points. In both of these comparisons, the root mean squares for the equipercentile estimate are consistently larger than the root mean squares using the Rasch estimates. In some instances, these indices are equal, but the Rasch root mean squares in both comparisons are generally smaller.

Tables 4.3.6 and 4.3.7 show the results of the analysis of MAT Intermediate Form F and Sat Intermediate II Form W administered to 1431 subjects. In Table 4.3.6, the Rasch results are compared to the recommended results for grade five from the ATS, and in Table 4.3.7, the Rasch results are compared to the recommended results for grade 6. This is the same procedure that was applied in Tables 4.3.4 and 4.3.5 except that here the administration order of the tests was reversed, therefore, a different sample was used. When the fifth grade estimate of the equipercentile method was used in Table 4.3.6, the raw score predictions differ mostly by two and once by three in the later half of the raw score scale. In most cases when the root mean squares differ, the equipercentile root mean squares are smaller. When the sixth grade results from the equipercentile method was used as the estimated raw score, the predicted Rasch raw score differed at the most and only occasionally by two raw score points. The root mean squares generally are smaller for the equipercentile results with an average difference less than one.

Table 4.3.8 shows results from a relatively poorly fitting test pair. Table 4.3.8 shows the analysis of the results where SRA Green

Form E and CAT Level 4 Form A were administered to 774 subjects in that order. Both of these tests were designed for grade 6 only; therefore, the equated results form the ATS were obtained from their sixth grade tables. These two tests have only 47.6% and 47.5% of their items respectively with slopes within the range of .8 to 1.2. The predicted raw scores from the two methods differ at the most by two raw score points with these being mostly located in the upper part of the raw score scale. The root mean squares usually are smaller when the equipercentile predictions are used.

The comparisons in Table 4.3.9 can be described as similar to those in Table 4.3.8. Here, CAT Level 4 Form A and ITBS Level 12 Form 5 were administered, respectively, to 836 subjects. Since both of these tests were designed for use at the sixth grade level only, only sixth grade equated scores were available from the ATS. The results shown in Table 4.3.9 differ somewhat from the other comparisons that have been made, since the largest differences in raw score estimates are found in the lower part of the distribution. Many of the root mean squares in this comparison are equal for the two predictions; however, for those that differ, the equipercentile root mean squares are usually smaller.

4.4 Concluding Comments

A comment on the value of the conditional means is appropriate. These in no-way are "correct answers." The conditional mean technique is best considered a different equating technique that is not used. A set of conditional means is identical to the unsmoothed general curvilinear regression of the equated test on the base test. The

choice of a regression procedure would require two different equating tables for each test pair, depending on which test of the pair was regressed on the other. This aspect of regression technique makes it an inappropriate one for defining score pairs as equivalent, since it is inconsistent with the uniqueness aspect that equated scores must have.

Moreover, the root mean squares of residuals are also easy to overinterpret. The root mean square of residuals around the conditional means are always smaller than the corresponding values for the equated scores. This results from a well-known statistical fact--sums of squares around a mean are always less than sums of squares around any other value. Thus, the comparative sizes of two root mean squares do not provide unequivocal comparisons of results.

Perhaps the best way to evaluate the results presented is a simple visual inspection of the two vectors of equated scores. Many of the scores for the two methods of equating are not different. Most comparisons differ by one or two points, and occassionally by three, but rarely by four points. In general, the results are strikingly similar; what deviations there are that do exist are thoroughly eclipsed by the respective standard errors of measurement.

Table 4.3.1

Base Test: SAT Int. I Form W

Equated Test: ITBS Level I Form 5

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq	Mean	R	E	Mean	R	E
1	0.	*	1.	2.	*	*	*
2	3.	*	2.	3.	*	*	*
3	2.	*	2.	4.	*	*	*
4	3.	*	3.	5.	*	*	*
5	11.	9.5	4.	6.	3.9	6.4	4.8
6	19.	9.7	5.	7.	2.7	5.4	3.8
7	18.	11.3	6.	8.	3.0	6.1	4.5
8	29.	10.0	7.	9.	3.6	4.6	3.7
9	23.	11.7	8.	10.	4.4	5.8	4.7
10	30.	12.2	9.	11.	4.7	5.7	4.8
11	38.	12.4	10.	12.	4.3	4.9	4.3
12	40.	12.7	11.	13.	4.9	5.2	5.0
13	40.	13.3	12.	14.	5.1	5.3	5.2
14	44.	15.3	13.	15.	4.5	5.1	4.5
15	37.	16.5	15.	16.	4.8	5.1	4.9
16	36.	17.2	16.	17.	5.1	5.2	5.1
17	32.	18.3	17.	18.	5.1	5.3	5.1
18	39.	17.4	18.	19.	5.5	5.6	5.3
19	51.	19.8	19.	21.	4.9	5.0	5.1
20	47.	19.9	21.	22.	5.0	5.1	5.4
21	40.	23.5	22.	23.	4.2	4.4	4.2
22	30.	23.9	23.	24.	4.9	5.0	4.9
23	31.	24.2	25.	25.	4.8	4.9	5.1
24	36.	25.6	26.	27.	5.3	5.3	5.5
25	37.	25.5	27.	28.	4.2	4.5	4.9
26	29.	25.6	29.	29.	4.8	5.8	5.8
27	31.	28.8	30.	30.	3.4	3.6	3.6
28	29.	29.1	31.	31.	3.9	4.3	4.3
29	14.	31.4	32.	32.	3.2	3.3	3.3
30	33.	31.3	33.	33.	4.6	4.9	4.9
31	13.	30.9	34.	34.	5.0	5.8	5.8
32	20.	32.6	35.	35.	2.9	3.8	3.8
33	8.	32.8	36.	35.	2.0	3.8	3.0
34	8.	34.5	36.	36.	1.3	2.0	2.0
35	2.	*	37.	37.	*	*	*
36	6.	34.8	37.	37.	1.9	2.9	2.9
37	4.	*	37.	38.	*	*	*

*Values were not computed where frequencies were less than 5.

Table 4.3.2

Base Test: MAT Level E Form F

Equated Test: SAT Int. I Form W

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq.	Mean	R	E	Mean	R	E
1	0.	*	1.	0.	*	*	*
2	0.	*	1.	1.	*	*	*
3	2.	8.5	1.	1.	7.5	10.6	10.6
4	1.	8.0	1.	2.	0	7.0	6.0
5	2.	10.0	1.	2.	2.0	9.2	8.2
6	3.	7.0	2.	3.	2.0	5.4	4.5
7	8.	7.6	2.	3.	3.0	6.4	5.5
8	3.	10.0	2.	4.	1.4	8.1	6.2
9	2.	6.5	3.	4.	1.5	3.8	2.9
10	5.	8.2	3.	5.	1.0	5.3	3.3
11	10.	9.7	4.	5.	3.0	6.5	5.6
12	11.	9.5	4.	6.	4.4	7.1	5.6
13	8.	8.8	4.	7.	2.7	5.5	3.2
14	12.	9.0	5.	7.	3.1	5.0	3.7
15	9.	9.0	5.	8.	2.8	4.9	3.0
16	8.	9.0	6.	8.	1.6	3.4	1.9
17	18.	9.2	6.	9.	2.8	4.3	2.8
18	13.	10.2	7.	9.	2.3	4.0	2.6
19	7.	10.9	7.	9.	3.2	5.0	3.7
20	22.	10.6	8.	10.	2.9	3.9	3.0
21	12.	10.3	9.	10.	2.4	2.7	2.4
22	3.	10.3	9.	10.	1.9	2.3	1.9
23	8.	14.3	10.	11.	5.8	7.2	6.7
24	11.	10.8	10.	11.	2.0	2.2	2.0
25	9.	10.3	11.	12.	1.9	2.1	2.6
26	9.	12.0	12.	12.	3.6	3.6	3.6
27	6.	11.0	13.	12.	3.4	4.0	3.6
28	11.	12.7	13.	13.	3.2	3.2	3.2
29	17.	11.5	14.	13.	3.1	4.0	3.4
30	8.	15.9	15.	13.	5.4	5.5	6.2
31	11.	14.0	15.	14.	3.8	3.9	3.8
32	14.	15.7	16.	14.	3.5	3.5	3.9
33	13.	14.8	17.	15.	2.9	3.6	2.9
34	22.	14.9	18.	15.	3.3	4.6	3.4
35	19.	17.1	19.	16.	3.9	4.3	4.0
36	18.	15.6	19.	17.	3.5	4.9	3.8
37	22.	17.9	20.	17.	3.8	4.4	3.9
38	31.	18.2	21.	18.	3.0	4.1	3.0
39	29.	18.5	22.	19.	4.2	5.4	4.2
40	30.	18.6	23.	20.	4.1	6.0	4.3
41	20.	21.1	24.	21.	3.1	4.3	3.1
42	32.	21.4	25.	22.	3.1	4.8	3.2
43	43.	23.2	26.	23.	4.1	5.0	4.2
44	29.	24.1	27.	24.	3.5	4.6	3.5
45	36.	24.6	28.	26.	4.3	5.5	4.6
46	40.	26.2	29.	28.	4.1	4.9	4.4
47	26.	28.4	31.	30.	3.8	4.6	4.1
48	26.	28.8	32.	32.	3.5	4.8	4.8
49	10.	29.4	34.	34.	2.5	5.3	5.3

*Values were not computed where frequencies were less than 5.

Table 4.3.3

Base Test: MAT Level E Form F

Equated Test: SRA Blue Form E

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq	Mean	R	E	Mean	R	E
1	0	*	1	0	*	*	*
2	0	*	1	1	*	*	*
3	2	8.5	1	2	*	*	*
4	1	8.0	1	2	*	*	*
5	2	10.0	1	2	*	*	*
6	2	7.0	2	4	*	*	*
7	8	7.6	2	5	3.0	6.4	4.0
8	3	10.0	2	5	*	*	*
9	2	6.5	3	6	*	*	*
10	5	8.2	3	7	1.0	5.3	1.5
11	10	9.7	4	7	3.0	6.5	4.1
12	11	9.5	4	8	4.4	7.1	4.7
13	8	8.8	5	8	2.7	4.6	2.8
14	12	9.0	5	9	3.1	5.0	3.1
15	9	9.0	6	9	2.8	4.1	2.8
16	8	9.0	6	10	1.6	3.4	1.9
17	18	9.2	7	10	2.8	3.6	2.9
18	13	10.2	7	10	2.3	3.9	2.3
19	7	10.9	8	11	3.2	4.3	3.2
20	22	10.6	9	11	2.9	3.3	2.9
21	12	10.3	9	11	2.4	2.7	2.5
22	3	10.3	10	12	*	*	*
[illegible]	8	14.3	11	12	5.8	6.7	6.2
24	11	10.8	11	12	2.0	2.0	2.3
25	9	10.3	12	13	1.9	2.6	3.3
26	9	12.0	13	13	3.6	3.7	3.7
27	6	11.0	14	14	3.4	4.5	4.5
28	11	12.7	15	14	3.2	3.9	3.5
29	17	11.5	15	14	3.1	4.7	4.0
30	8	15.9	16	15	5.4	5.4	5.5
31	11	14.0	17	15	3.8	4.8	3.9
32	14	15.7	18	16	3.5	4.1	3.5
33	13	14.8	19	17	2.9	5.1	3.6
34	22	14.9	20	17	3.3	6.1	4.0
35	19	17.1	21	18	3.9	5.4	3.9
36	18	15.6	23	19	3.5	8.2	4.9
37	22	17.9	24	20	3.8	7.2	4.4
38	31	18.2	25	21	3.0	7.4	4.1
39	29	18.5	26	22	4.2	8.6	5.4
40	30	18.6	27	24	4.1	9.3	6.8
41	20	21.1	29	25	3.1	8.5	5.0
42	32	21.4	30	27	3.1	9.1	6.4
43	43	23.2	32	29	4.1	9.7	7.1
44	29	24.1	33	31	3.5	9.6	7.8
45	36	24.6	34	33	4.3	10.3	9.4
46	40	26.2	36	35	4.1	10.6	9.7
47	26	28.4	37	37	3.8	9.4	9.4
48	26	28.8	39	39	3.5	10.8	10.8
49	10	29.4	40	40	2.5	10.9	10.9

*Values were not computed where frequencies were less than 5.

Table 4.3.4

Base Test: SAT Int. II Form W

Equated Test: MAT Int. Form F

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq.	Mean	R	E	Mean	R	E
1	0.	*	2.	3.	*	*	*
2	2.	*	4.	4.	*	*	*
3	5.	9.0	6.	6.	2.8	4.1	4.1
4	10.	13.3	8.	7..	3.3	6.3	7.1
5	16.	14.8	10.	9.	4.8	6.7	7.5
6	20.	14.0	11.	10.	5.3	6.1	6.6
7	27.	13.8	13.	12.	4.2	4.3	4.6
8	27.	17.3	14.	13.	3.9	5.2	5.8
9	35.	16.8	16.	14.	5.2	5.2	5.9
10	44.	17.6	17.	16.	6.2	6.2	6.4
11	44.	19.1	19.	17.	4.9	4.9	5.4
12	60.	18.3	20.	19.	5.6	5.8	5.6
13	48.	19.4	21.	21.	6.0	6.2	6.2
14	46.	21.9	22.	22.	5.3	5.3	5.3
15	60.	23.3	24.	24.	6.4	6.4	6.4
16	45.	23.0	25.	25.	5.8	6.1	6.1
17	50.	26.1	26.	27.	6.4	6.4	6.4
18	48.	27.8	27.	28.	6.1	6.1	6.1
19	37.	27.9	28.	29.	5.5	5.5	5.6
20	45.	28.4	29.	31.	6.4	6.4	6.9
21	37.	29.3	30.	32.	5.1	5.1	5.8
22	35.	31.5	31.	33.	4.7	4.7	5.0
23	44.	32.2	32.	34.	5.5	5.5	5.8
24	37.	32.8	33.	35.	6.1	6.1	6.5
25	46.	34.1	34.	36.	6.4	6.4	6.7
26	35.	34.6	35.	37.	4.4	4.4	5.0
27	34.	36.6	36.	38.	6.7	6.7	6.8
28	33.	37.1	37.	38.	4.7	4.7	4.8
29	22.	37.3	38.	39.	3.8	3.8	4.1
30	28.	37.7	38.	40.	4.2	4.2	4.8
31	20.	38.0	39.	41.	6.1	6.2	6.9
32	35.	40.2	40.	41.	3.9	3.9	4.0
33	24.	38.6	41.	42.	3.4	4.1	4.8
34	30.	41.8	42.	43.	2.9	2.9	3.2
35	15.	40.7	42.	44.	4.1	4.3	5.3
36	13.	43.2	43.	44.	2.7	2.7	2.8
37	20.	44.6	44.	45.	2.4	2.5	2.4
38	10.	43.3	45.	46.	2.8	3.2	3.9
39	13.	45.2	45.	47.	2.2	2.2	2.9
40	12.	46.0	46.	47.	2.0	2.0	2.3
41	9.	46.9	46.	48.	2.4	2.6	2.7
42	6.	47.5	47.	48.	1.6	1.7	1.7
43	4.	*	48.	49.	*	*	*
44	5.	46.8	48.	49.	1.5	1.9	2.6
45	1.	*	49.	50.	*	*	*
46	1.	*	49.	50.	*	*	*
47	3.	*	49.	50.	*	*	*

*Values were not computed where frequencies were less than 5.

Table 4.3.5

Base Test: SAT Int. II Form

Equated Test: MAT Int. Form F

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Resi uals		
	Freq.	Mean	R	E	Mean	R	E
1	0.	*	2.	1.	*	*	*
2	2.	*	4.	2.	*	*	*
3	5.	9.0	6.	5.	2.8	4.0	4.8
4	10.	13.3	8.	7.	3.3	6.3	7.1
5	16.	14.8	10.	9.	4.8	6.7	7.5
6	20.	14.0	11.	10.	5.3	6.1	6.6
7	27.	13.8	13.	11.	4.2	4.3	5.0
8	27.	17.3	14.	12.	3.9	5.2	6.6
9	35.	16.8	16.	14.	5.2	5.2	5.9
10	44.	17.6	17.	15.	6.2	6.2	6.7
11	44.	19.1	19.	16.	4.9	4.9	5.8
12	60.	18.3	20.	18.	5.6	5.8	5.6
13	48.	19.4	21.	19.	6.0	6.2	6.0
14	46.	21.9	22.	21.	5.3	5.3	5.3
15	60.	23.3	24.	23.	6.4	6.4	6.4
16	45.	23.0	25.	24.	5.8	6.1	5.8
17	50.	26.1	26.	26.	6.4	6.4	6.4
18	48.	27.8	27.	27.	6.1	6.1	6.1
19	37.	27.9	28.	28.	5.5	5.5	5.5
20	45.	28.4	29.	30.	6.4	6.4	6.6
21	37.	29.3	30.	31.	5.1	5.1	5.4
22	35.	31.5	31.	32.	4.7	4.7	4.7
23	44.	32.2	32.	33.	5.5	5.5	5.6
24	37.	32.8	33.	34.	6.1	6.1	6.2
25	46.	34.1	34.	35.	6.4	6.4	6.5
26	35.	34.6	35.	36.	4.4	4.4	4.6
27	34.	36.6	36.	37.	6.7	6.7	6.7
28	33.	37.1	37.	38.	4.7	4.7	4.8
29	22.	37.3	38.	39.	3.8	3.8	4.1
30	28.	37.7	38.	40.	4.2	4.2	4.8
31	20.	38.0	39.	40.	6.1	6.2	6.5
32	35.	40.2	40.	41.	3.9	3.9	4.0
33	24.	38.6	41.	42.	3.4	4.1	4.8
34	30.	41.8	42.	43.	2.9	2.9	3.2
35	15.	40.7	42.	43.	4.1	4.3	4.7
36	13.	43.2	43.	44.	2.7	2.7	2.8
37	20.	44.6	44.	45.	2.4	2.5	2.4
38	10.	43.3	45.	45.	2.8	3.2	3.2
39	13.	45.2	45.	46.	2.2	2.2	2.4
40	12.	46.0	46.	47.	2.0	2.0	2.3
41	9.	46.9	46.	47.	2.4	2.6	2.4
42	6.	47.5	47.	48.	1.6	1.7	1.7
43	4.	*	48.	49.	*	*	*
44	5.	46.8	48.	49.	1.5	1.9	2.6
45	1.	*	49.	50.	*	*	*
46	1.	*	49.	50.	*	*	*
47	3.	*	49.	50.	*	*	*

*Values were not computed where frequencies were less than 5.

Table 4.3.6

Base Test: MAT Int. Form F

Equated Test: SAT Int. II Form W

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq.	Mean	R	E	Mean	R	E
1	2.	8.0	1.	0.	*	*	*
2	0.	*	1.	0.	*	*	*
3	1.	13.0	1.	1.	*	*	*
4	2.	6.0	2.	2.	*	*	*
5	1.	5.0	2.	2.	*	*	*
6	3.	9.3	3.	3.	*	*	*
7	4.	10.3	3.	4.	*	*	*
8	6.	11.5	4.	5.	4.4	8.7	7.9
9	10.	7.7	5.	5.	2.9	3.9	3.9
10	7.	11.9	5.	6.	3.6	7.8	6.9
11	18.	8.9	6.	7.	2.9	4.1	3.5
12	25.	10.3	6.	7.	3.4	5.5	4.7
13	32.	11.4	7.	8.	2.7	5.1	4.3
14	31.	10.5	8.	9.	3.2	4.0	3.5
15	28.	10.8	8.	10.	2.3	3.6	2.4
16	26.	12.5	9.	10.	3.3	4.8	4.1
17	39.	11.2	10.	11.	4.2	4.4	4.2
18	29.	12.5	11.	12.	3.1	3.5	3.2
19	31.	12.7	11.	12.	3.9	4.3	4.0
20	29.	14.0	12.	13.	3.6	4.0	3.7
21	21.	14.5	13.	13.	3.8	4.1	4.1
22	39.	14.5	14.	14.	3.2	3.3	3.3
23	35.	15.8	14.	15.	3.8	4.2	3.9
24	35.	15.3	15.	15.	4.2	4.3	4.3
25	34.	17.1	16.	16.	4.2	4.3	4.3
26	41.	17.0	17.	16.	4.0	4.0	4.1
27	47.	17.9	18.	17.	4.6	4.6	4.7
28	38.	20.2	19.	18.	4.5	4.7	5.0
29	50.	19.3	20.	19.	5.1	5.1	5.1
30	49.	19.7	21.	20.	4.1	4.3	4.1
31	40.	21.4	22.	20.	4.8	4.9	5.0
32	44.	20.4	23.	21.	4.8	5.4	4.8
33	42.	22.8	24.	22.	4.6	4.8	4.7
34	44.	23.3	25.	23.	6.3	6.5	6.3
35	47.	24.2	26.	24.	5.3	5.6	5.3
36	57.	26.7	27.	25.	4.6	4.6	4.9
37	35.	27.3	28.	26.	4.8	4.8	5.0
38	49.	27.7	29.	28.	5.0	5.1	5.0
39	48.	29.6	31.	29.	4.8	5.0	4.9
40	46.	30.0	32.	30.	5.0	5.4	5.0
41	34.	32.8	33.	32.	5.3	5.3	5.4
42	37.	32.1	34.	33.	4.0	4.4	4.1
43	30.	32.7	36.	34.	4.2	5.3	4.4
44	40.	34.7	37.	36.	5.3	5.8	5.5
45	32.	37.4	39.	37.	4.7	5.0	4.7
46	37.	37.7	40.	38.	3.6	4.3	3.7
47	19.	37.8	42.	40.	4.1	5.9	4.7
48	17.	38.5	44.	41.	5.0	7.5	5.6
49	11.	41.5	46.	44.	2.8	5.3	3.7

*Values were not computed where frequencies were less than 5.

Table 4.3.7

Base Test: MAT Int. Form F

Equated Test: SAT Int. II Form W

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq.	Mean	R	E	Mean	R	E
1	2.	8.0	1.	1.	1	7.1	7.1
2	0.	*	1.	2.	*	*	*
3	1.	13.0	1.	2.	0	12.0	11.0
4	2.	6.5	2.	3.	2.0	4.5	3.6
5	1.	5.0	2.	3.	0.	3.0	2.0
6	3.	9.3	3.	4.	6.2	8.9	8.2
7	4.	10.3	3.	4.	3.4	8.0	7.1
8	6.	11.5	4.	5.	4.4	8.7	7.9
9	10.	7.7	5.	6.	2.9	3.9	3.3
10	7.	11.9	5.	6.	3.6	7.8	6.9
11	18.	8.9	6.	7.	2.9	4.1	3.5
12	25.	10.3	6.	8.	3.4	5.5	4.1
13	32.	11.4	7.	9.	2.7	5.1	3.6
14	31.	10.5	8.	9.	3.2	4.0	3.5
15	28.	10.8	8.	10.	2.3	3.6	2.4
16	26.	12.5	9.	11.	3.3	4.8	3.6
17	39.	11.2	10.	12.	4.2	4.4	4.3
18	29.	12.5	11.	12.	3.1	3.5	3.2
19	31.	12.7	11.	13.	3.9	4.3	3.9
20	29.	13.7	12.	14.	3.6	4.0	3.6
21	21.	14.5	13.	14.	3.8	4.1	3.9
22	39.	14.5	14.	15.	3.2	3.3	3.3
23	35.	15.8	14.	15.	3.8	4.2	3.9
24	35.	15.3	15.	16.	4.2	4.3	4.3
25	34.	17.1	16.	17.	4.2	4.3	4.2
26	41.	17.0	17.	17.	4.0	4.0	4.0
27	47.	17.9	18.	18.	4.6	4.6	4.6
28	38.	20.1	19.	19.	4.5	4.7	4.7
29	50.	19.3	20.	20.	5.1	5.1	5.1
30	49.	19.7	21.	20.	4.1	4.3	4.1
31	40.	21.4	22.	21.	4.8	4.9	4.8
32	44.	20.4	23.	22.	4.8	5.4	5.0
33	42.	22.8	24.	23.	4.6	4.8	4.6
34	44.	23.3	25.	24.	4.3	6.5	6.3
35	47.	24.2	26.	25.	5.3	5.6	5.4
36	57.	26.7	27.	26.	4.6	4.6	4.7
37	35.	27.3	28.	27.	4.8	4.8	4.8
38	49.	27.7	29.	28.	5.0	5.1	5.0
39	48.	29.6	31.	29.	4.8	5.0	4.9
40	46.	30.0	32.	31.	5.0	5.4	5.1
41	34.	32.8	33.	32.	5.3	5.3	5.4
42	37.	32.1	34.	33.	4.0	4.4	4.1
43	30.	32.7	36.	35.	4.2	5.3	4.8
44	40.	34.7	37.	36.	5.3	5.8	5.5
45	32.	37.4	39.	38.	4.7	5.0	4.8
46	37.	37.4	40.	39.	3.6	4.3	3.9
47	19.	37.8	42.	41.	4.1	5.9	5.2
48	17.	38.5	44.	42.	5.0	7.5	6.2
49	11.	41.5	46.	44.	2.8	5.3	3.7

*Values were not computed where frequencies were less than 5.

Table 4.3.8

Base Test: SRA Green Form E

Equated Test: CAT Level 4 Form A

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq.	Mean	R	E	Mean	R	E
1	0.	*	1.	1.	*	*	*
2	0.	*	2.	1.	*	*	*
3	0.	*	2.	2.	*	*	*
4	2.	*	3.	2.	*	*	*
5	5.	5.4	4.	3.	2.4	2.8	3.4
6	1.	*	4.	4.	*	*	*
7	3.	*	5.	5.	*	*	*
8	5.	9.8	6.	6.	3.5	5.2	5.2
9	10.	10.2	7.	7.	3.5	4.7	4.7
10	20.	8.6	8.	8.	4.2	4.2	4.2
11	11.	10.5	8.	9.	3.7	4.4	4.0
12	22.	11.3	9.	10.	4.9	5.4	5.1
13	18.	9.6	10.	11.	3.7	3.8	4.0
14	15.	12.7	11.	12.	4.1	4.5	4.2
15	9.	12.9	12.	13.	4.5	4.6	4.5
16	11.	13.3	12.	14.	3.8	4.0	3.9
17	13.	14.5	13.	14.	3.8	4.1	3.8
18	23.	15.1	14.	15.	3.6	3.7	3.6
19	21.	16.5	15.	16.	3.5	3.8	3.6
20	22.	16.9	16.	17.	4.0	4.1	4.0
21	20.	16.1	17.	18.	4.1	4.2	4.5
22	24.	19.6	17.	18.	3.6	4.4	3.9
23	16.	19.8	18.	19.	3.3	3.8	3.4
24	28.	19.8	19.	20.	4.6	4.6	4.6
25	20.	20.3	20.	21.	5.2	5.2	5.6
26	19.	21.4	21.	21.	3.9	4.0	4.0
27	24.	22.8	22.	22.	4.1	4.1	4.1
28	22.	23.5	23.	23.	3.7	3.8	3.8
29	35.	24.2	24.	24.	3.5	3.5	3.5
30	24.	24.2	25.	25.	2.6	2.7	2.7
31	28.	24.9	26.	25.	2.9	3.1	2.9
32	30.	25.8	27.	26.	4.3	4.5	4.3
33	27.	27.0	28.	27.	2.8	2.9	2.8
34	33.	27.8	29.	28.	2.8	3.0	2.8
35	29.	28.4	30.	29.	3.4	3.7	3.4
36	37.	28.9	31.	30.	4.0	4.5	4.1
37	32.	29.5	32.	31.	2.4	3.5	2.9
38	25.	31.2	34.	32.	2.7	3.9	2.8
39	37.	31.2	35.	33.	2.8	4.7	3.3
40	23.	32.8	36.	34.	2.0	3.7	2.3
41	18.	33.1	38.	36.	3.0	5.7	4.2

*Values were not computed where frequencies were less than 5.

Table 4.3.9

Base Test: CAT Level 4 Form A

Equated Test: ITBS Level 12 Form 5

Base Test Scores		Estimated Scores			Equated Test Root Mean Squares of Residuals		
	Freq.	Mean	R	E	Mean	R	E
1	1.	*	1.	3.	*	*	*
2	0.	*	2.	4.	*	*	*
3	0.	*	3.	5.	*	*	*
4	1.	*	4.	6.	*	*	*
5	6.	13.3	5.	8.	1.6	8.5	5.6
6	15.	13.3	6.	9.	3.2	7.9	5.3
7	7.	10.6	8.	10.	3.5	4.3	3.5
8	13.	14.8	9.	11.	3.2	6.7	5.0
9	16.	12.8	10.	12.	3.1	4.1	3.2
10	16.	13.9	11.	13.	3.2	4.3	3.3
11	21.	12.8	12.	14.	4.3	4.4	4.5
12	22.	15.8	14.	15.	5.1	5.4	5.2
13	33.	16.8	15.	16.	3.3	3.8	3.4
14	26.	17.5	16.	17.	4.7	4.9	4.7
15	20.	17.9	18.	18.	5.0	5.0	5.0
16	30.	20.1	19.	19.	5.1	5.2	5.2
17	36.	20.9	20.	20.	4.3	4.9	4.4
18	18.	22.2	21.	21.	4.0	4.2	4.2
19	28.	22.8	23.	23.	5.0	5.0	5.0
20	17.	24.2	24.	24.	4.8	4.8	4.8
21	28.	24.7	25.	25.	4.7	4.7	4.7
22	36.	25.6	27.	26.	4.9	5.1	4.9
23	34.	26.1	28.	27.	4.8	5.2	4.9
24	40.	27.3	29.	28.	4.4	4.7	4.5
25	34.	30.1	30.	29.	4.5	4.5	4.7
26	33.	30.6	32.	31.	4.1	4.4	4.2
27	35.	31.3	33.	32.	4.2	4.5	4.2
28	40.	32.1	34.	33.	5.1	5.5	5.2
29	40.	32.8	35.	34.	4.2	4.7	4.4
30	39.	33.8	36.	35.	4.3	4.9	4.5
31	29.	35.6	37.	37.	3.9	4.1	4.1
32	27.	36.3	38.	38.	2.8	3.3	3.3
33	25.	35.9	39.	39.	4.5	5.5	5.5
34	26.	39.3	40.	40.	4.1	4.2	4.2
35	17.	37.1	41.	41.	2.6	4.7	4.7
36	14.	39.2	42.	42.	3.4	4.4	4.8
37	3.	*	43.	43.	*	*	*
38	6.	43.0	44.	44.	1.3	1.6	1.6
39	2.	*	45.	45.	*	*	*

*Values were not computed where frequencies were less than 5.

Chapter 5

Summary and Conclusions

We would like to conclude this report by discussing three issues that we feel ought to be addressed. The issues are model-data fit, errors, and the National Reference Scale for Reading (NRS). Also, we discuss the use of item scale values for constructing new tests and interpreting such tests with the National Reference Scale. These comments will be followed by restating the project objectives, directing the reader to relevant sections of the report, and briefly restating conclusions when relevant.

5.1 Some Comments

In one sense model-data fit is the central issue in this report. If the Rasch model fits the tests used here, then its consequences simplify the equating problem. We have presented a number of ways to evaluate fit and we have attempted to persuade the reader that fit criteria can and ought to be different for different applications. We do not believe that a routine application of some statistical test is adequate or even correct. The problem refuses to be tied in a nice neat package. The tests used here are neither very good nor very bad. Their fit is mediocre, and, in fact, rather homogeneously mediocre; yet, we believe the degree of model-data fit is sufficient for test equating applications. One thing is clear, we need to learn more about model-data fit and the robustness of the Rasch Model for test analysis

applications.

One probably ought not to equate tests, at least in the sense of raw score-to-raw score equating. It certainly is an unnecessary step since it requires the tests to be put on a common scale before equivalent raw scores can be determined, and that process itself is sufficient. Going one step further, to raw score equating, leads to assignment errors (i.e., those errors resulting from calling two raw scores equal when their ability difference is not zero). These errors are not inconsequential, as Table 5.1.1 illustrates.

That Table presents a typical score (19) on STEP II Vocabulary together with several error estimates associated with that score. These errors are shown in both log ability units and NRS units. The standard error of measurement, stability index for occurrence, and the four sample size stability values pertain to the score itself; while the equating constant error and the stability indexes for race and IQ are averaged for the test. Finally, the average assignment error was taken over the scores of the 14 other tests to which the score of 19 was equated (see Table 10, Appendix E). We present these values to give the reader a quick summary of the size of errors from various sources as compared with the standard error of measurement. Naturally, these errors are not independent, but it is interesting to note their relative size and particularly the fact that assignment errors are as large or larger than any other source. However, for all practical purposes, the various errors are quite small in comparison to the standard error of measurement. It is important to note that assignment error occurs in traditional methodology such as that used in the ATS. That is, even if one does not choose to

Table 5.1.1

A Comparison of Various Error Sources for a Raw Score of 19 on STEP II Level 3 Form A Vocabulary

	Log Ability	NRS
Raw score = 19	.746	207
Standard error of measurement	.45	4.5
Average assignment error	.0414	0.4
Equating constant error	.0085	0.1
Stability		
N = 500	.0133	0.1
N = 1000	.0100	0.1
N = 2000	.0072	0.1
N = 4000	.0062	0.1
Occurence	.0178	0.2
Race	.0266	0.3
IQ	.0422	0.4

use trait methods, raw score to raw score equating yields assignment errors. Two scores on different tests must correspond to slightly different ability levels. Assignment error can be avoided only if one uses scaling methods that generate reference scales like our NRS.

5.2 The National Reference Scale for Reading

Because a common Rasch Model ability scale was necessary for equating and since we feel that in principle this scale is a natural and obvious one for calibrating and reporting scores, we have produced a transformation of the adjusted ability values and called it the National Reference Scale for Reading. The NRS is a simple linear transformation of the log ability values corresponding to a test's raw scores. The transformation is: $NRS = 200 + 10(A + C)$, where A is the ability estimate for a given raw score on a particular test given in the tables in Volume II and C is the equating constant for that test. This scale spans all tests and all levels. It essentially provides both horizontal and vertical equating of the tests, and does not depend on who happens to take the test and which test they take.

We chose this particular transformation for several practical reasons: (1) log ability is a scale that is not familiar to very many potential test users, it is frequently confusing and sometimes difficult to communicate; test users are more comfortable with an "integer" scale. (2) the lowest score in the easiest test is 144 and the highest score on the hardest test is 263 (for the tests used here), a difference of 119 units, when one significant digit of the log ability scale is carried. Thus, a three digit scale is required to span the score range. (3) it is

our desire to eventually add lower level tests and upper level tests (or to see it done) to this NRS for reading; thus sufficient "floor" and "ceiling" needed to be provided. Centering the scale where we did ought to provide room at both ends.

5.3 Estimating National Reference Scale Scores from any Collection of Items

In Volume II we proivde, for each test, item and ability parameter estimates, NRS scores for all raw scores, and the adjustment constant for each test. With the item calibrations and the adjustment (equating) constant, it is a simple matter to produce a test scoring table of raw scores, NRS score equivalents, and standard errors of measurement for any test of any length using any collection of the 2,644 items from any of the tests. For example, suppose you wanted to put together a 28 item test composed of one item from each of the 14 primary forms of the tests included here, both vocabulary and comprehension. The steps to follow are:

1. Select the items you wish to administer.
2. Record their item calibration value (labelled "LOG EASINESS") from the tables in Volume II.
3. Subtract the test's equating constant to its' corresponding item Log Easiness.
4. Enter these adjusted item easiness values into the short FORTRAN computer program provided in Appendix G to estimate NRS scores.
5. The output would be a scoring table with raw scores (1-27) their equivalent NRS scores, and corresponding standard errors of measurement.

5.4 Summary

Objective 1. To describe the methodology for test equating using the Rasch Model. Both general Rasch equating methods and the specific techniques used in this report appear in Chapter 3 of this Volume. Rasch equating consists first of adjusting all ability estimates in one test by a change of scale origin. The amount of change is the equating constant. A second step is the matching of raw scores on the tests to be equated. It is recommended that this second step, the raw score-to-raw score equating be deleted in future equating studies in favor of raw score-to-common reference scale equating.

Objective 2. To provide basic item analysis data for each test in the data base. These data appear in Volume II. The first part of Volume II gives traditional and Rasch item parameter estimates for all tests. The second part of Volume II summarizes the item information for each test and has presentations of the relationships of selected items statistics to the item mean square fit index.

Objective 3. To evaluate the fit of the Rasch Model with respect to those tests that were part of the base data. Concepts of fit and procedures for evaluating fit were discussed in Chapter 2. It is recommended that test fit be determined primarily by the degree to which specific objectivity is observed in the data. In particular, specific objectivity in regard to scoring tables is relevant for assessing appropriateness of the model for use in equating. The evidence supports the use of Rasch techniques for equating these tests. Moreover, the tests appear to have little variance in regard to fit considerations.

Objective 4. To investigate the stability of Rasch Model parameter estimates under conditions of varying sample size and sample composition. Chapter 2 presents the analyses appropriate to this objective. The primary conclusion is that data do appear to be highly consistent across various sample sizes and compositions. However, anomalies are present in some data in regard to intelligence or racial group differences. We believe these preceived differences to be of minimal consequence in regard to equating, but are of some theoretical interest. In no case do differences in scoring tables for different groups approach standard errors in magnitude.

Objective 5. To provide tables of equated scores based on Rasch Model methods. Equating tables for raw score-to-raw score equating appear in Appendix C and D of Volume I. Volume II presents raw score-to National Reference Scale calibrations.

Objective 6. To estimate the equating error associated with the use of the above equating methods. Equating error estimates and estimation procedures appear in Chapter 3 of this Volume. Appendix E and F of this volume present measures of assignment error. Assignment error appears to be small, but significant, error source which can be eliminated by the use of the National Reference Scale. Other error sources appear to be inconsequential when compared to usual standard errors of measurement.

Objective 7. To compare the results of equating with those obtained in the Anchor Test Study. The discussion of comparisons of the two projects appears in Chapter 4 of this Volume. In most instances, differences in our equatings and Anchor Test Project equatings are inconsequential.

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Appendix A

Stability of Parameter Estimates Over Occurrence in the Design

TABLE 1

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CAT 3-A Occurrences= 10 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	2.0498	0.2327	1.9775	0.1840
2	2.4548	0.1697	2.3706	0.2208
3	1.7240	0.1648	1.6130	0.1185
4	1.9373	0.1464	1.6958	0.1393
5	1.1049	0.2815	1.1003	0.3493
6	0.6460	0.1600	0.6604	0.1109
7	1.5186	0.1571	1.4195	0.2290
8	1.6226	0.1214	1.5306	0.1001
9	1.5709	0.1061	1.3821	0.1403
10	0.7353	0.1344	0.6373	0.1394
11	1.5305	0.1373	1.4601	0.1184
12	0.5222	0.2091	0.3584	0.2089
13	0.5903	0.0579	0.5702	0.0974
14	-0.0221	0.0977	-0.0961	0.1232
15	0.5342	0.1490	0.4046	0.1563
16	0.2409	0.1634	-0.0254	0.1293
17	0.1926	0.1436	0.1370	0.1447
18	0.7800	0.1163	0.6600	0.1214
19	-0.0311	0.1755	-0.1684	0.1558
20	-0.7584	0.0749	-0.7578	0.0770
21	-0.0279	0.0802	-0.0639	0.1110
22	0.3871	0.0729	0.3438	0.0699
23	-0.7520	0.1119	-0.7159	0.1602
24	-0.3077	0.0720	-0.2661	0.0968
25	0.1385	0.0743	0.0307	0.1183
26	-0.6314	0.1193	-0.5735	0.1348
27	-0.7217	0.0748	-0.7015	0.1213
28	-0.2365	0.1226	-0.2725	0.0699
29	-0.8390	0.1297	-0.8972	0.1211
30	-0.9109	0.0934	-0.7418	0.1286
31	-1.0227	0.1048	-0.9614	0.0796
32	-1.1413	0.0830	-1.0405	0.0873
33	-1.2382	0.1265	-1.0751	0.1395
34	-1.0473	0.1035	-0.8406	0.1211
35	-1.2496	0.1239	-1.1157	0.1370
36	-1.2092	0.0770	-0.9508	0.0952
37	-1.4660	0.1414	-1.2705	0.1889
38	-1.8544	0.1104	-1.4964	0.0975
39	-1.9813	0.0674	-1.7474	0.1721
40	-2.8325	0.1297	-2.5738	0.1493

TABLE 2

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CAT 4-A Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	1.5103	0.0941	1.4750	0.1040
2	1.1076	0.0990	0.9589	0.0854
3	2.6943	0.1812	2.4806	0.2082
4	1.5637	0.0973	1.4091	0.1682
5	1.2744	0.0670	1.1789	0.0697
6	0.6629	0.1129	0.5369	0.1437
7	0.7447	0.1258	0.6680	0.0504
8	1.2667	0.0720	1.2139	0.1400
9	1.0073	0.0867	0.9904	0.0880
10	1.1230	0.0770	0.9093	0.0850
11	0.4564	0.1828	0.3459	0.1666
12	1.3781	0.0888	1.1644	0.1596
13	0.9286	0.0624	0.8456	0.0418
14	-0.4697	0.0999	-0.3316	0.2546
15	1.1181	0.0847	0.9530	0.0868
16	1.4509	0.0785	1.2400	0.0387
17	0.3716	0.0874	0.3410	0.1318
18	0.7283	0.0668	0.6576	0.0705
19	0.4987	0.0978	0.3676	0.0643
20	0.6241	0.1218	0.5301	0.0755
21	0.1446	0.0416	0.0611	0.1407
22	-0.4406	0.1071	-0.5246	0.1457
23	-0.5029	0.0403	-0.5793	0.0783
24	-0.1074	0.0812	0.0270	0.0809
25	0.2233	0.0660	0.2461	0.1043
26	-0.0620	0.1217	0.0040	0.0778
27	-0.4469	0.1029	-0.4879	0.0996
28	-0.7099	0.0896	-0.5993	0.1141
29	-1.0941	0.1799	-1.1059	0.1775
30	-1.0204	0.1919	-0.9110	0.1227
31	-1.1363	0.0533	-1.1147	0.0547
32	-0.8220	0.0900	-0.6901	0.0816
33	-1.9897	0.0853	-1.8253	0.1474
34	-1.3496	0.0891	-1.2521	0.1030
35	-1.6323	0.1125	-1.3854	0.1295
36	-1.6946	0.1204	-1.3864	0.1166
37	-1.5391	0.1322	-1.3231	0.1308
38	-1.9686	0.1041	-1.7111	0.1744
39	-1.5403	0.0670	-1.3906	0.1350
40	-2.3500	0.2286	-1.9856	0.1321

TABLE 3

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests = CTBS 2-Q Occurrences= 10 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	2.4241	0.1388	2.5987	0.2087
2	2.3136	0.1213	2.1740	0.2091
3	1.2572	0.1535	1.2316	0.1542
4	0.5229	0.0972	0.5432	0.1380
5	0.8761	0.1661	0.8435	0.1876
6	0.6404	0.1163	0.6557	0.1107
7	1.4797	0.2109	1.3911	0.1426
8	0.9069	0.2171	0.7739	0.1545
9	0.7404	0.2663	0.6906	0.3134
10	0.5865	0.0886	0.5224	0.0968
11	1.2698	0.2059	1.1828	0.1545
12	0.2228	0.1342	0.3252	0.1103
13	0.6045	0.1022	0.5806	0.1342
14	0.1812	0.0821	0.1667	0.1506
15	0.4984	0.1264	0.4481	0.1096
16	0.1178	0.1075	0.1492	0.0935
17	0.7898	0.1488	0.7133	0.1479
18	0.4229	0.2134	0.3205	0.2284
19	0.8176	0.0802	0.7135	0.1446
20	-0.3107	0.1495	-0.2900	0.0657
21	-0.3622	0.1018	-0.3479	0.0933
22	-0.7076	0.1293	-0.7281	0.0896
23	-1.1153	0.1640	-0.9798	0.1508
24	-0.9618	0.1131	-0.8868	0.1573
25	-0.4012	0.1498	-0.3666	0.1626
26	-0.4732	0.1957	-0.3787	0.1745
27	-0.1406	0.0629	-0.2162	0.0833
28	0.4969	0.1195	0.3888	0.1326
29	-0.6873	0.0751	-0.7143	0.1394
30	-1.1759	0.1326	-1.2137	0.1350
31	-1.4752	0.1005	-1.6119	0.1362
32	-0.2592	0.1370	-0.2548	0.2499
33	-1.1755	0.0966	-1.1643	0.0712
34	0.1962	0.0564	0.2757	0.1037
35	-1.5701	0.2729	-1.4737	0.2560
36	-0.1844	0.0941	-0.1261	0.1059
37	-2.3909	0.1152	-2.2475	0.2741
38	-1.7958	0.1015	-1.7237	0.1404
39	-1.2081	0.2189	-1.1042	0.1592
40	-0.9703	0.1337	-0.8606	0.0676

TABLE 4

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CTBS 3-Q Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	2.1617	0.1307	2.0050	0.1781
2	1.5453	0.1229	1.5389	0.2211
3	1.4250	0.0935	1.4614	0.0868
4	1.7135	0.0802	1.6311	0.2202
5	1.0082	0.0673	1.0456	0.1034
6	0.8577	0.1029	0.7851	0.1122
7	0.3620	0.0963	0.3700	0.1671
8	0.8883	0.0717	0.7841	0.1961
9	0.4757	0.0800	0.5687	0.1310
10	0.3087	0.0954	0.2241	0.0878
11	1.0043	0.1086	0.9460	0.1387
12	0.4457	0.1117	0.3687	0.0972
13	1.2968	0.1086	1.2693	0.0835
14	0.6450	0.0902	0.5311	0.1085
15	0.3168	0.0960	0.3517	0.1251
16	-0.1068	0.0997	-0.2466	0.1106
17	-0.2362	0.0397	-0.2370	0.0378
18	-0.1855	0.0518	-0.0064	0.2137
19	-0.5788	0.0825	-0.5680	0.1062
20	0.0488	0.1244	0.0280	0.0918
21	0.0023	0.0720	-0.0546	0.1287
22	1.0767	0.0719	0.9363	0.1202
23	-0.8563	0.0683	-0.8986	0.2024
24	-0.3430	0.1357	-0.4166	0.1035
25	-0.4885	0.1119	-0.3976	0.0637
26	-0.6660	0.0593	-0.6836	0.1859
27	-0.5478	0.0738	-0.5061	0.0843
28	-1.1972	0.2102	-1.1296	0.4074
29	0.0275	0.0567	0.0581	0.1005
30	-0.2238	0.1012	-0.2600	0.0913
31	-0.7575	0.1926	-0.6583	0.1570
32	-1.3503	0.0973	-1.3451	0.0410
33	-0.6725	0.1290	-0.6906	0.1317
34	-0.9588	0.1057	-0.9140	0.1070
35	-0.7697	0.0784	-0.6949	0.0914
36	-1.2183	0.1349	-1.0719	0.1291
37	-0.2035	0.1172	-0.0766	0.1142
38	-1.5220	0.0801	-1.4830	0.2070
39	-1.3422	0.1289	-1.2029	0.1039
40	-1.3862	0.0529	-1.3619	0.1388

TABLE 5

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= ITBS 10-5 Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	0.9644	0.1153	0.8813	0.0742
2	0.3614	0.0818	0.4270	0.0619
3	0.5631	0.1270	0.6207	0.1459
4	0.3366	0.1512	0.3126	0.0984
5	1.4673	0.1932	1.3491	0.1392
6	-0.0159	0.0910	-0.0833	0.1485
7	0.6244	0.1468	0.6636	0.1233
8	1.1366	0.0654	1.0116	0.1553
9	0.3806	0.1156	0.3727	0.1111
10	0.0889	0.0938	0.0667	0.1355
11	0.1189	0.1794	0.1994	0.2358
12	1.2013	0.1316	1.1047	0.1046
13	0.5003	0.1120	0.4140	0.1266
14	0.1190	0.1081	0.0669	0.0385
15	0.1967	0.1262	0.1796	0.1136
16	-0.0707	0.1508	-0.2709	0.0360
17	1.0481	0.0498	1.0269	0.1097
18	0.1746	0.0856	0.2077	0.1176
19	0.2993	0.1182	0.2284	0.1026
20	-0.6230	0.1011	-0.5016	0.1914
21	-0.6319	0.1467	-0.6900	0.0944
22	-0.1323	0.1068	-0.1733	0.1027
23	-1.0774	0.1778	-1.0673	0.2265
24	-0.1549	0.0784	-0.1084	0.1265
25	0.4214	0.0796	0.4037	0.1159
26	-0.0087	0.1049	0.0667	0.1336
27	-1.3621	0.1440	-1.3677	0.1167
28	-0.2820	0.0870	-0.2323	0.0703
29	-0.9530	0.1385	-0.9620	0.1086
30	-0.9494	0.1929	-0.9701	0.1429
31	-1.2101	0.2462	-1.1777	0.1413
32	-0.4654	0.1501	-0.4540	0.0878
33	-0.3703	0.1462	-0.2616	0.1391
34	-0.3391	0.1473	-0.2111	0.0856
35	-0.1103	0.1637	-0.1020	0.0634
36	-0.0290	0.1929	-0.0021	0.1157
37	-0.7917	0.1017	-0.6383	0.1859
38	-0.4261	0.1248	-0.3291	0.1291

TABLE 6

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= ITBS 11-5 Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	0.5319	0.1414	0.4641	0.1796
2	1.0351	0.1398	0.9440	0.1739
3	0.2713	0.1038	0.1477	0.1203
4	1.4191	0.1905	1.2840	0.1658
5	0.7973	0.1065	0.7630	0.0705
6	0.8113	0.1592	0.7226	0.0966
7	0.2530	0.1468	0.2579	0.1377
8	-0.0320	0.0634	-0.0171	0.1209
9	0.5607	0.1146	0.5416	0.0678
10	-0.4419	0.1349	-0.5210	0.1305
11	0.5151	0.0617	0.3910	0.1221
12	0.9530	0.1751	0.9143	0.1013
13	0.4780	0.1310	0.4407	0.1208
14	-0.8807	0.1143	-0.8839	0.0870
15	0.4661	0.0916	0.4113	0.1052
16	-0.3209	0.1980	-0.3313	0.1202
17	-0.5431	0.1362	-0.6570	0.0982
18	-0.8744	0.2679	-0.8674	0.1773
19	0.1600	0.0783	0.1090	0.1411
20	0.1597	0.0873	0.2124	0.1085
21	0.2897	0.0670	0.2097	0.1219
22	0.4409	0.0804	0.3646	0.0669
23	0.6864	0.0921	0.5466	0.1605
24	-0.0869	0.1139	-0.0191	0.1339
25	0.3574	0.0990	0.1730	0.1081
26	-0.0969	0.0890	-0.0091	0.0820
27	-0.3544	0.0819	-0.3034	0.1414
28	0.0904	0.1416	0.0487	0.0918
29	-0.2283	0.0842	-0.1091	0.1156
30	-0.0764	0.2122	-0.1064	0.1172
31	0.1353	0.1078	0.1307	0.0920
32	-0.3660	0.2745	-0.2366	0.0837
33	-0.1304	0.1389	-0.1276	0.1191
34	-0.5649	0.0662	-0.5110	0.0484
35	-1.3156	0.1737	-1.1819	0.1066
36	0.1460	0.0672	0.1997	0.0677
37	-0.8843	0.1252	-0.8327	0.1223
38	-0.6320	0.1538	-0.4821	0.1104
39	-0.1641	0.1267	-0.0873	0.0903
40	0.5797	0.1085	0.6589	0.0969
41	-2.1354	0.1515	-1.9664	0.1216
42	-0.4880	0.1235	-0.3641	0.0481
43	-0.5196	0.0993	-0.3196	0.1305

TABLE 7

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= ITBS 12-5 Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	0.3483	0.1556	0.3180	0.0855
2	-0.3824	0.0611	-0.4784	0.1190
3	0.5259	0.0443	0.5726	0.1387
4	0.6730	0.0986	0.6640	0.1048
5	0.9774	0.1122	0.8949	0.1492
6	0.8991	0.1580	0.9137	0.1067
7	1.2529	0.1335	1.1313	0.0963
8	0.6650	0.1341	0.6440	0.1208
9	0.8814	0.1429	0.8530	0.1263
10	0.5927	0.0581	0.5287	0.0869
11	0.1550	0.0642	0.2017	0.1380
12	1.0674	0.1092	0.9080	0.1614
13	0.3121	0.0933	0.2803	0.1160
14	0.6157	0.1298	0.5697	0.1396
15	1.0080	0.1220	1.0316	0.0367
16	0.8046	0.1328	0.7581	0.0839
17	0.6901	0.1364	0.6206	0.0909
18	0.2493	0.0330	0.3176	0.1152
19	-0.4894	0.1936	-0.5011	0.1706
20	1.0719	0.1117	0.9861	0.1106
21	-0.0941	0.1133	-0.1153	0.0541
22	-0.0183	0.2016	0.0473	0.1168
23	0.8173	0.1627	0.8284	0.1383
24	1.5011	0.1217	1.3339	0.1398
25	-1.4440	0.1576	-1.3469	0.1027
26	0.3573	0.0873	0.3003	0.1140
27	0.3304	0.1010	0.3864	0.0899
28	-0.3207	0.0768	-0.3379	0.0717
29	-0.1340	0.1635	-0.0703	0.1255
30	-0.5713	0.1490	-0.5169	0.1439
31	-1.4844	0.1350	-1.3833	0.1741
32	-0.0404	0.0678	-0.1219	0.0739
33	-1.1316	0.1033	-1.1027	0.1511
34	-1.3811	0.0984	-1.3057	0.0723
35	0.2459	0.1068	0.2217	0.0730
36	-0.5161	0.1060	-0.3989	0.1641
37	-0.7723	0.1188	-0.6506	0.1252
38	0.4534	0.1045	0.4351	0.1206
39	-0.0463	0.0962	-0.0879	0.0846
40	-0.7716	0.1164	-0.7640	0.1000
41	-0.7023	0.0788	-0.6739	0.0957
42	-0.6829	0.0218	-0.6959	0.0824
43	-0.3851	0.0883	-0.4159	0.1059
44	-1.0391	0.1483	-0.9013	0.1414
45	-0.7741	0.0803	-0.7471	0.0950
46	-3.3126	0.2602	-3.1317	0.3282

TABLE 8

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= MAT E-F Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	1.2677	0.3207	1.2336	0.4564
2	2.3920	0.2155	2.3931	0.2695
3	2.2167	0.3833	2.1144	0.2506
4	0.9744	0.1601	0.9407	0.1714
5	1.8694	0.1415	1.7806	0.1891
6	1.9656	0.1478	1.8623	0.1812
7	1.8903	0.1923	1.8002	0.2856
8	1.1366	0.1040	1.2974	0.1666
9	1.3049	0.1475	1.3789	0.1776
10	0.7214	0.2107	0.7033	0.1588
11	1.3890	0.1484	1.3799	0.2173
12	0.9313	0.2344	0.8729	0.1762
13	0.7043	0.1349	0.6599	0.1617
14	0.8863	0.1543	0.6793	0.1911
15	0.2707	0.1613	0.2777	0.2196
16	0.5697	0.1499	0.4867	0.1899
17	0.9280	0.1980	0.7841	0.0856
18	0.5513	0.1608	0.5343	0.1980
19	0.0596	0.2299	-0.1591	0.1548
20	1.2351	0.1847	1.0781	0.1026
21	0.3646	0.1678	0.2201	0.1041
22	0.0544	0.1396	-0.0191	0.1579
23	0.3781	0.1290	0.4076	0.1834
24	-0.6839	0.1208	-0.5843	0.1645
25	0.0801	0.0897	0.0674	0.1265
26	-0.2837	0.1865	-0.4266	0.0760
27	0.1056	0.1011	0.1174	0.1215
28	-0.0894	0.1218	-0.1067	0.1301
29	-0.4224	0.1083	-0.4159	0.0785
30	0.0079	0.1540	-0.0211	0.0941
31	-0.3364	0.1060	-0.2303	0.1127
32	-0.0410	0.0731	-0.0939	0.1635
33	0.0731	0.1475	0.0921	0.1036
34	-0.7484	0.1372	-0.6471	0.1195
35	-0.5623	0.2130	-0.3984	0.2219
36	-0.6723	0.0924	-0.6879	0.1926
37	-0.4650	0.1469	-0.4641	0.1210
38	-0.2577	0.0760	-0.2396	0.0621
39	-0.8949	0.1257	-0.8386	0.2336
40	-0.8680	0.0744	-0.8340	0.0898
41	-0.9440	0.1230	-0.8226	0.1039
42	-1.0424	0.1028	-1.0434	0.1154
43	-1.3086	0.1498	-1.1797	0.1388
44	-2.3024	0.1941	-2.1786	0.2217
45	-1.5264	0.1306	-1.4651	0.1899
46	-1.4263	0.1149	-1.3141	0.1322
47	-1.8746	0.1624	-1.6839	0.1829
48	-2.3379	0.1281	-2.1850	0.2626
49	-2.5801	0.2478	-2.3687	0.1548
50	-2.8087	0.3424	-2.7539	0.4082

TABLE 9

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= MAT I-F Occurrences= 11 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	1.7875	0.1231	1.7282	0.1834
2	1.8618	0.2293	1.7672	0.2128
3	2.8746	0.2053	2.6418	0.1686
4	1.7913	0.1214	1.7307	0.1604
5	1.3184	0.1900	1.2148	0.1187
6	2.2526	0.2103	2.0461	0.1503
7	0.9868	0.1119	0.9337	0.1381
8	1.8265	0.2051	1.7251	0.1591
9	-1.4533	0.1634	-1.3423	0.2389
10	1.0074	0.0994	0.8492	0.1460
11	1.1738	0.1394	1.0371	0.1628
12	0.8155	0.0801	0.7990	0.0992
13	0.9325	0.1730	0.7528	0.1957
14	0.4475	0.0991	0.4350	0.0901
15	1.0874	0.1672	1.0626	0.1472
16	0.8314	0.1488	0.6883	0.1548
17	0.2849	0.1008	0.3303	0.1278
18	0.4831	0.1145	0.4448	0.0834
19	0.4740	0.1056	0.4559	0.1383
20	-0.5038	0.1872	-0.5255	0.1508
21	0.0946	0.1798	0.0376	0.2007
22	0.7900	0.1282	0.6945	0.1199
23	0.4773	0.1511	0.4585	0.1731
24	0.4128	0.1450	0.6327	0.1835
25	0.1219	0.1249	0.0827	0.1410
26	-0.5192	0.0940	-0.5216	0.1021
27	0.2428	0.1605	0.2332	0.1230
28	0.4071	0.1581	0.3362	0.1922
29	-0.0671	0.1128	-0.1038	0.1377
30	-1.5095	0.2384	-1.3536	0.2625
31	0.4855	0.1131	0.5235	0.0919
32	-0.3167	0.1350	-0.2931	0.1651
33	-0.1337	0.1077	-0.1230	0.0890
34	-0.5328	0.1559	-0.3949	0.1213
35	-0.8668	0.1173	-0.8987	0.1040
36	-0.9211	0.1283	-0.8302	0.1333
37	-0.4095	0.0876	-0.3632	0.0832
38	-1.2160	0.1251	-1.1051	0.1583
39	-0.6285	0.1652	-0.6635	0.1071
40	-1.2858	0.1446	-1.1510	0.1617
41	-0.7673	0.1659	-0.7702	0.1434
42	-0.9502	0.1191	-0.9877	0.1121
43	-1.7572	0.1888	-1.7195	0.1925
44	-0.7424	0.1217	-0.6772	0.1070
45	-1.5903	0.1287	-1.4580	0.1757
46	-1.5681	0.1565	-1.5159	0.1767
47	-1.4717	0.1090	-1.3222	0.1450
48	-2.2412	0.1453	-1.9761	0.1025
49	-1.5863	0.1535	-1.4638	0.1216
50	-2.2303	0.1414	-2.0824	0.1987

TABLE 10

Stability of Parameter Estimates as a Function of Occurrence in the Design

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Tests= STEP 4-A Occurrences= 14 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	1.7416	0.2328	1.7167	0.1469
2	2.5837	0.2235	2.1999	0.2088
3	2.1171	0.1400	1.9146	0.1675
4	1.3245	0.1227	1.1936	0.1358
5	1.6301	0.1305	1.4144	0.1234
6	1.1964	0.1469	1.1429	0.1595
7	1.8640	0.1686	1.6784	0.1580
8	1.4082	0.1598	1.1684	0.1907
9	1.4436	0.1804	1.2752	0.1891
10	0.1004	0.1084	0.1324	0.1593
11	0.0825	0.1624	0.0784	0.1399
12	0.6194	0.1885	0.5046	0.1161
13	0.9569	0.1376	0.7966	0.1172
14	0.5309	0.1780	0.5344	0.1623
15	0.2739	0.0980	0.1696	0.1674
16	-0.1106	0.1236	-0.0166	0.1144
17	0.5616	0.0966	0.5140	0.1108
18	-0.1144	0.0792	-0.1523	0.1137
19	-0.0388	0.0985	-0.0396	0.0827
20	-1.6746	0.1707	-1.5214	0.1008
21	-1.5397	0.0760	-1.3701	0.0990
22	-0.9489	0.0815	-0.8854	0.1247
23	-0.5434	0.2055	-0.5039	0.2170
24	-1.6559	0.1457	-1.3937	0.1650
25	-1.6771	0.1426	-1.5816	0.0996
26	-1.0174	0.0817	-0.8279	0.0785
27	-2.0459	0.2089	-1.8907	0.2473
28	-2.0142	0.1387	-1.8177	0.0802
29	-2.6077	0.1857	-2.3291	0.1665
30	-2.4453	0.1499	-2.1035	0.1391

TABLE 11

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SRA BL-E Occurrences= 10 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	1.7825	0.1944	1.6379	0.1902
2	0.9286	0.1534	0.7214	0.1541
3	0.0430	0.1658	-0.2260	0.1938
4	-0.0044	0.0972	0.0050	0.0720
5	0.6635	0.0961	0.4817	0.1164
6	0.2397	0.0494	0.1554	0.0853
7	0.7048	0.1274	0.5253	0.1078
8	-0.3140	0.0990	-0.2940	0.0900
9	0.4093	0.1053	0.3248	0.1207
10	-0.1368	0.0616	-0.1258	0.1045
11	-0.4593	0.0707	-0.5446	0.1456
12	-0.8615	0.0905	-0.7487	0.1451
13	1.7003	0.1625	1.6090	0.1581
14	1.8279	0.2020	1.8072	0.2080
15	0.2265	0.0896	0.2471	0.1142
16	0.0794	0.0783	0.1184	0.1153
17	0.8716	0.0878	0.7876	0.1300
18	0.8462	0.1538	0.7840	0.1627
19	0.6463	0.1259	0.5523	0.1101
20	0.8052	0.0815	0.7693	0.1469
21	0.8445	0.1487	0.8375	0.1575
22	0.5998	0.0986	0.6534	0.1156
23	0.0033	0.0906	-0.0750	0.0811
24	-0.6157	0.1133	-0.5149	0.1212
25	-0.2315	0.0845	-0.1345	0.1446
26	-0.0656	0.0875	0.0685	0.1182
27	0.4449	0.0901	0.4439	0.0879
28	-0.3577	0.1677	-0.2750	0.1270
29	0.6562	0.0843	0.6901	0.1085
30	0.4468	0.0860	0.4207	0.1537
31	-0.0970	0.0537	-0.0347	0.0768
32	-1.0099	0.1206	-0.8242	0.1023
33	-0.5421	0.0833	-0.3797	0.0913
34	-0.4805	0.1398	-0.4698	0.1241
35	-0.7028	0.0899	-0.6798	0.0915
36	-0.9998	0.1151	-0.9930	0.1889
37	-1.1236	0.0998	-1.0555	0.0975
38	-1.7228	0.1715	-1.6266	0.2191
39	-1.3579	0.1743	-1.2930	0.1816
40	-1.2304	0.1198	-1.1674	0.1102
41	-1.5955	0.1572	-1.4338	0.1990
42	-0.8610	0.1122	-0.7439	0.1763

TABLE 12

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SRA GR-E Occurrences= 7 Parameters= ITEM

Item or Score Group	Mean	Std. Dev.	Mean	Std. Dev.
1	1.8584	0.1072	1.8181	0.1715
2	0.9703	0.1269	0.9201	0.1386
3	1.6793	0.1325	1.5026	0.2056
4	1.0130	0.0801	0.8396	0.1114
5	1.2079	0.1465	0.8543	0.1298
6	0.7570	0.1431	0.5826	0.0904
7	-0.8400	0.0869	-0.8594	0.1405
8	-0.7013	0.1634	-0.8397	0.1302
9	-0.3633	0.0558	-0.4566	0.1228
10	-1.1234	0.1800	-0.9683	0.1588
11	0.0757	0.0725	0.1384	0.1135
12	-0.0753	0.1090	0.0441	0.1159
13	0.4679	0.1407	0.5013	0.1047
14	1.8524	0.1033	1.8820	0.1977
15	1.5134	0.1178	1.6219	0.2015
16	0.7674	0.1747	0.8293	0.1514
17	0.1356	0.1105	0.2270	0.0627
18	0.2603	0.1525	0.2701	0.0599
19	0.5734	0.1191	0.5521	0.0953
20	0.2104	0.1384	0.2347	0.1286
21	-0.0147	0.1105	-0.1134	0.1405
22	-0.0397	0.1590	0.0324	0.1201
23	-0.7321	0.1580	-0.7839	0.1525
24	-0.4979	0.1140	-0.4443	0.1442
25	0.0696	0.0998	-0.0003	0.0661
26	-0.5816	0.1043	-0.4639	0.1885
27	0.4029	0.1217	0.4283	0.0825
28	0.7394	0.1606	0.7799	0.1200
29	0.3617	0.0948	0.4830	0.0913
30	-0.6443	0.1012	-0.6770	0.2179
31	-0.2959	0.0845	-0.3160	0.1488
32	0.2593	0.0707	0.3174	0.1071
33	-0.0254	0.0910	-0.0434	0.0878
34	-0.6014	0.1403	-0.6287	0.1115
35	-0.5300	0.1844	-0.4473	0.1170
36	-0.9596	0.1100	-1.0350	0.1258
37	-0.9693	0.1198	-0.9741	0.1537
38	-0.6266	0.1877	-0.5109	0.1173
39	-1.2647	0.2367	-1.2779	0.1873
40	-1.2503	0.1312	-1.1330	0.1460
41	-1.7497	0.1371	-1.7093	0.2419
42	-1.2890	0.1053	-1.1766	0.0521

TABLE 13

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SAT I-W Occurrences= 7 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	2.0880	0.1165	1.8681	0.1821
2	1.5809	0.1088	1.4769	0.1248
3	1.5784	0.0679	1.3526	0.1948
4	2.1670	0.2457	1.9509	0.3243
5	1.4883	0.1451	1.3403	0.0576
6	1.1160	0.2293	0.9277	0.1525
7	0.7529	0.1614	0.6663	0.1140
8	0.7496	0.1013	0.5686	0.0630
9	1.9506	0.1764	1.6806	0.1224
10	0.9910	0.0991	0.8511	0.0811
11	0.5067	0.1562	0.4509	0.1395
12	0.7859	0.1102	0.6164	0.0754
13	0.5359	0.1343	0.3826	0.1106
14	0.6540	0.0982	0.3813	0.0888
15	0.6017	0.0871	0.4834	0.0715
16	0.7134	0.1272	0.5753	0.0837
17	1.4861	0.1217	1.3519	0.1337
18	0.0211	0.0997	0.0003	0.1493
19	0.3069	0.2001	0.2569	0.2275
20	0.0657	0.0893	0.1247	0.0943
21	0.0586	0.1424	0.0083	0.0619
22	-0.3270	0.1043	-0.2620	0.1429
23	-0.0790	0.1364	-0.1889	0.1795
24	-0.4794	0.1863	-0.5789	0.1098
25	-0.5296	0.1282	-0.4024	0.0971
26	-0.2847	0.1038	-0.2373	0.0853
27	-0.6016	0.0552	-0.5956	0.1153
28	-0.8647	0.0397	-0.7280	0.1518
29	-1.0494	0.0952	-1.0717	0.1644
30	-0.8356	0.1567	-0.6317	0.1240
31	-1.6864	0.1437	-1.3673	0.1587
32	-1.3829	0.1134	-1.1346	0.1525
33	-2.2833	0.0849	-1.9481	0.2423
34	-2.2913	0.1892	-2.0277	0.1877
35	-2.0501	0.1952	-1.7249	0.1237
36	-1.8276	0.1233	-1.4270	0.1603
37	-1.7496	0.1514	-1.4867	0.1935
38	-1.8763	0.0795	-1.5010	0.1497

TABLE 14

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SAT II-W Occurrences= 11 Parameters= ITEM

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	2.0992	0.2102	1.8619	0.1787
2	2.7114	0.1771	2.4859	0.2528
3	2.0149	0.1547	1.7919	0.1395
4	2.2099	0.2049	2.0188	0.2728
5	1.1877	0.1721	1.1189	0.2872
6	1.9988	0.1868	1.7195	0.1451
7	1.2257	0.0812	1.1258	0.1355
8	1.1120	0.2086	0.8832	0.1988
9	0.6926	0.1672	0.6229	0.1922
10	2.1144	0.1623	1.8882	0.1525
11	0.9869	0.1252	0.8254	0.1518
12	0.7025	0.0841	0.4896	0.1152
13	0.1422	0.1029	0.0745	0.1203
14	0.4325	0.1645	0.3348	0.1587
15	0.1945	0.3135	0.1305	0.1643
16	0.6322	0.0798	0.4645	0.0728
17	0.3766	0.0650	0.2004	0.0956
18	0.4205	0.1574	0.4045	0.1217
19	-0.0295	0.1069	-0.1446	0.0921
20	-0.3869	0.1155	-0.4192	0.1805
21	1.4365	0.1376	1.2375	0.1375
22	0.5235	0.1880	0.3786	0.1363
23	0.3809	0.0596	0.3000	0.0957
24	0.0714	0.1706	-0.0033	0.1852
25	-0.1297	0.1206	-0.1958	0.1032
26	0.4255	0.0994	0.3533	0.0420
27	0.1147	0.1142	0.0660	0.0608
28	-0.2129	0.0902	-0.1375	0.1734
29	0.4885	0.1330	0.3836	0.1164
30	-0.7130	0.1724	-0.6513	0.1982
31	-0.2105	0.1148	-0.2569	0.1065
32	-0.0564	0.1236	-0.0614	0.1410
33	-1.1771	0.0998	-1.0502	0.1274
34	-0.8503	0.0988	-0.7768	0.1352
35	-1.3472	0.1552	-1.1019	0.1695
36	-0.8431	0.0482	-0.7933	0.0881
37	-0.5733	0.1481	-0.5079	0.1638
38	-0.2295	0.2085	-0.1845	0.1761
39	-1.2176	0.1538	-1.0015	0.1028
40	-0.8815	0.1613	-0.7504	0.1322
41	-1.2554	0.1531	-0.9806	0.1212
42	-1.2457	0.1446	-0.9895	0.1661
43	-1.8933	0.1776	-1.5045	0.1708
44	-1.5611	0.1375	-1.2322	0.1298
45	-1.9595	0.1544	-1.6532	0.1590
46	-2.2540	0.2364	-1.8905	0.0923
47	-2.4857	0.1540	-2.1035	0.1915
48	-3.1814	0.4536	-2.7701	0.3433

TABLE 15

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CAT 3-A Occurrences= 10 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.3301	0.0506	-4.2470	0.0390
2	-3.5717	0.0467	-3.4909	0.0346
3	-3.1007	0.0430	-3.0225	0.0309
4	-2.7474	0.0395	-2.6719	0.0281
5	-2.4581	0.0360	-2.3855	0.0263
6	-2.2093	0.0327	-2.1397	0.0245
7	-1.9880	0.0295	-1.9221	0.0230
8	-1.7868	0.0264	-1.7246	0.0219
9	-1.6012	0.0236	-1.5424	0.0210
10	-1.4273	0.0211	-1.3722	0.0199
11	-1.2625	0.0182	-1.2114	0.0191
12	-1.1052	0.0159	-1.0586	0.0179
13	-0.9540	0.0135	-0.9116	0.0167
14	-0.8080	0.0115	-0.7698	0.0156
15	-0.6659	0.0098	-0.6324	0.0144
16	-0.5267	0.0083	-0.4981	0.0133
17	-0.3905	0.0074	-0.3662	0.0120
18	-0.2559	0.0069	-0.2366	0.0106
19	-0.1226	0.0071	-0.1085	0.0095
20	0.0100	0.0078	0.0188	0.0083
21	0.1421	0.0088	0.1457	0.0075
22	0.2745	0.0102	0.2729	0.0068
23	0.4079	0.0116	0.4008	0.0066
24	0.5425	0.0132	0.5298	0.0070
25	0.6794	0.0148	0.6611	0.0077
26	0.8192	0.0163	0.7948	0.0089
27	0.9624	0.0178	0.9320	0.0104
28	1.1103	0.0196	1.0740	0.0122
29	1.2639	0.0211	1.2215	0.0141
30	1.4251	0.0226	1.3762	0.0163
31	1.5954	0.0243	1.5404	0.0186
32	1.7778	0.0260	1.7158	0.0212
33	1.9753	0.0274	1.9067	0.0236
34	2.1936	0.0290	2.1176	0.0264
35	2.4405	0.0304	2.3571	0.0294
36	2.7289	0.0322	2.6373	0.0331
37	3.0833	0.0345	2.9830	0.0372
38	3.5571	0.0369	3.4476	0.0414
39	4.3216	0.0401	4.2016	0.0470

TABLE 16

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CAT 4-A Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.2784	0.0414	-4.1769	0.0416
2	-3.5219	0.0373	-3.4257	0.0354
3	-3.0549	0.0345	-2.9637	0.0307
4	-2.7067	0.0321	-2.6203	0.0273
5	-2.4241	0.0304	-2.3417	0.0245
6	-2.1823	0.0291	-2.1040	0.0223
7	-1.9684	0.0279	-1.8941	0.0205
8	-1.7743	0.0267	-1.7040	0.0184
9	-1.5953	0.0253	-1.5294	0.0169
10	-1.4280	0.0243	-1.3660	0.0156
11	-1.2691	0.0232	-1.2116	0.0142
12	-1.1174	0.0217	-0.0646	0.0131
13	-0.9707	0.0205	-0.9226	0.0117
14	-0.8287	0.0191	-0.7854	0.0107
15	-0.6899	0.0176	-0.6517	0.0093
16	-0.5537	0.0162	-0.5204	0.0083
17	-0.4191	0.0147	-0.3911	0.0074
18	-0.2854	0.0129	-0.2630	0.0060
19	-0.1526	0.0114	-0.1360	0.0052
20	-0.0197	0.0103	-0.0090	0.0046
21	0.1134	0.0091	0.1179	0.0042
22	0.2479	0.0085	0.2459	0.0043
23	0.3831	0.0083	0.3750	0.0047
24	0.5207	0.0092	0.5059	0.0057
25	0.6609	0.0103	0.6391	0.0072
26	0.8040	0.0125	0.7754	0.0090
27	0.9514	0.0144	0.9151	0.0106
28	1.1031	0.0171	1.0599	0.0124
29	1.2610	0.0197	1.2104	0.0143
30	1.4263	0.0225	1.3679	0.0163
31	1.6004	0.0253	1.5344	0.0186
32	1.7863	0.0282	1.7123	0.0211
33	1.9867	0.0314	1.9051	0.0233
34	2.2069	0.0347	2.1171	0.0255
35	2.4546	0.0380	2.3567	0.0280
36	2.7420	0.0416	2.6363	0.0307
37	3.0937	0.0455	2.9794	0.0335
38	3.5621	0.0494	3.4393	0.0358
39	4.3174	0.0541	4.1861	0.0388

TABLE 17

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CTBS 2-Q Occurrences= 10 Parameters= ABILITY

Item or Score Group	Mean	Std. Dev.	Mean	Std. Dev.
1	-4.1904	0.0547	-4.1765	0.0690
2	-3.4323	0.0507	-3.4145	0.0605
3	-2.9636	0.047-	-2.9438	0.0530
4	-2.6142	0.0437	-2.5934	0.0469
5	-2.3307	0.0402	-2.3093	0.0419
6	-2.0887	0.0368	-2.0674	0.0374
7	-1.8753	0.0336	-1.8549	0.0335
8	-1.6828	0.0303	-1.6629	0.0300
9	-1.5064	0.0277	-1.4874	0.0269
10	-1.3419	0.0248	-1.3241	0.0239
11	-1.1869	0.0222	-1.1703	0.0215
12	-1.0396	0.0194	-1.0243	0.0190
13	-0.8984	0.0170	-0.8847	0.0168
14	-0.7621	0.0146	-0.7498	0.0148
15	-0.6299	0.0123	-0.6189	0.0131
16	-0.5004	0.0105	-0.4911	0.0113
17	-0.3734	0.0086	-0.3655	0.0096
18	-0.2480	0.0072	-0.2417	0.0085
19	-0.1237	0.0063	-0.1189	0.0079
20	0.0002	0.0063	0.0033	0.0080
21	0.1242	0.0071	0.1257	0.0086
22	0.2489	0.0086	0.2486	0.0092
23	0.3746	0.0100	0.3726	0.0105
24	0.5021	0.0119	0.4984	0.0125
25	0.6320	0.0139	0.6265	0.0141
26	0.7651	0.0158	0.7580	0.0164
27	0.9017	0.0180	0.8929	0.0184
28	1.0435	0.0203	1.0330	0.0206
29	1.1913	0.0224	1.1789	0.0232
30	1.3467	0.0249	1.3325	0.0256
31	1.5111	0.0274	1.4952	0.0287
32	1.6875	0.0297	1.6697	0.0316
33	1.8795	0.0223	1.8596	0.0351
34	2.0915	0.0351	2.0698	0.0385
35	2.3316	0.0377	2.3080	0.0425
36	2.6125	0.0407	2.5867	0.0469
37	2.9584	0.0437	2.9302	0.0519
38	3.4221	0.0471	3.3916	0.0574
39	4.1742	0.0504	4.1412	0.0639

TABLE 18

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= CTBS 3-Q Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.0965	0.0284	-4.0641	0.0540
2	-3.3487	0.0254	-3.3190	0.0497
3	-2.8887	0.0227	-2.8613	0.0456
4	-2.5465	0.0202	-2.5214	0.0414
5	-2.2690	0.0178	-2.2459	0.0379
6	-2.0320	0.0158	-2.0109	0.0344
7	-1.8228	0.0137	-1.8036	0.0307
8	-1.6338	0.0120	-1.6163	0.0278
9	-1.4602	0.0101	-1.4444	0.0245
10	-1.2982	0.0087	-1.2844	0.0217
11	-1.1455	0.0072	-1.1334	0.0189
12	-1.0005	0.0059	-0.9901	0.0162
13	-0.8618	0.0043	-0.8530	0.0139
14	-0.7278	0.0031	-0.7206	0.0114
15	-0.5978	0.0022	-0.5920	0.0091
16	-0.4708	0.0014	-0.4667	0.0070
17	-0.3467	0.0014	-0.3440	0.0054
18	-0.2242	0.0022	-0.2231	0.0043
19	-0.1028	0.0027	-0.1033	0.0044
20	0.0175	0.0037	0.0159	0.0055
21	0.1377	0.0043	0.1343	0.0070
22	0.2582	0.0052	0.2536	0.0092
23	0.3793	0.0060	0.3736	0.0110
24	0.5020	0.0067	0.4946	0.0126
25	0.6265	0.0076	0.6179	0.0146
26	0.7540	0.0082	0.7439	0.0165
27	0.8847	0.0088	0.8733	0.0183
28	1.0195	0.0095	1.0071	0.0198
29	1.1603	0.0100	1.1464	0.0221
30	1.3078	0.0107	1.2926	0.0237
31	1.4645	0.0113	1.4480	0.0254
32	1.6318	0.0120	1.6146	0.0274
33	1.8142	0.0127	1.7956	0.0289
34	2.0162	0.0132	1.9964	0.0305
35	2.2450	0.0137	2.2243	0.0321
36	2.5142	0.0140	2.4923	0.0337
37	2.8467	0.0152	2.8239	0.0355
38	3.2963	0.0161	3.2723	0.0372
39	4.0328	0.0169	4.0077	0.0389

TABLE 19

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= ITBS 10-5 Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-3.8286	0.0329	-3.8060	0.0331
2	-3.0943	0.0304	-3.0739	0.0309
3	-2.6471	0.0285	-2.6291	0.0284
4	-2.3173	0.0262	-2.3010	0.0261
5	-2.0517	0.0242	-2.0367	0.0239
6	-1.8259	0.0224	-1.8126	0.0221
7	-1.6273	0.0205	-1.6157	0.0200
8	-1.4487	0.0186	-1.4384	0.0180
9	-1.2851	0.0172	-1.2761	0.0163
10	-1.1324	0.0153	-1.1251	0.0144
11	-0.9889	0.0137	-0.9829	0.0125
12	-0.8526	0.0120	-0.8474	0.0106
13	-0.7219	0.0104	-0.7179	0.0092
14	-0.5951	0.0087	-0.5926	0.0075
15	-0.4723	0.0073	-0.4703	0.0059
16	-0.3519	0.0060	-0.3511	0.0045
17	-0.2333	0.0046	-0.2334	0.0028
18	-0.1161	0.0032	-0.1171	0.0022
19	0.0006	0.0024	-0.0014	0.0026
20	0.1171	0.0025	0.1140	0.0035
21	0.2346	0.0040	0.2307	0.0048
22	0.3529	0.0052	0.3481	0.0063
23	0.4733	0.0065	0.4677	0.0074
24	0.5963	0.0080	0.5899	0.0090
25	0.7227	0.0098	0.7157	0.0107
26	0.8533	0.0115	0.8456	0.0121
27	0.9896	0.0133	0.9813	0.0136
28	1.1330	0.0152	1.1240	0.0150
29	1.2853	0.0170	1.2754	0.0167
30	1.4490	0.0187	0.4386	0.0182
31	1.6273	0.0210	1.6163	0.0197
32	1.8253	0.0229	1.8137	0.0211
33	2.0509	0.0249	2.0384	0.0228
34	2.3164	0.0271	2.3034	0.0243
35	2.6456	0.0297	2.6321	0.0260
36	3.0921	0.0319	3.0781	0.0274
37	3.8254	0.0345	3.8111	0.0289

TABLE 20

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= ITBS 11-5 Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-3.9311	0.0277	-3.9010	0.0170
2	-3.2044	0.0260	-3.1760	0.0158
3	-2.7651	0.0244	-2.7381	0.0151
4	-2.4430	0.0227	-2.4174	0.0140
5	-2.1847	0.0210	-2.1604	0.0132
6	-1.9667	0.0198	-1.9441	0.0122
7	-1.7764	0.0181	-1.7550	0.0115
8	-1.6059	0.0167	-1.5859	0.0107
9	-1.4503	0.0153	-1.4317	0.0098
10	-1.3066	0.0143	-1.2891	0.0092
11	-1.1714	0.0129	-1.1557	0.0085
12	-1.0441	0.0116	-1.0297	0.0078
13	-0.9226	0.0107	-0.9094	0.0070
14	-0.8057	0.0094	-0.7940	0.0064
15	-0.6930	0.0084	-0.6824	0.0058
16	-0.5836	0.0076	-0.5741	0.0053
17	-0.4761	0.0065	-0.4684	0.0046
18	-0.3711	0.0058	-0.3644	0.0039
19	-0.2673	0.0046	-0.2621	0.0036
20	-0.1643	0.0041	-0.1607	0.0030
21	-0.0623	0.0035	-0.0597	0.0026
22	0.0400	0.0036	0.0411	0.0024
23	0.1424	0.0037	0.1423	0.0021
24	0.2459	0.0039	0.2443	0.0024
25	0.3500	0.0047	0.3473	0.0027
26	0.4563	0.0055	0.4517	0.0030
27	0.5644	0.0063	0.5586	0.0039
28	0.6754	0.0074	0.6680	0.0044
29	0.7899	0.0085	0.7809	0.0049
30	0.9083	0.0099	0.8979	0.0056
31	1.0320	0.0109	1.0199	0.0066
32	1.1620	0.0127	1.1480	0.0074
33	1.2997	0.0138	1.2841	0.0085
34	1.4469	0.0154	1.4296	0.0093
35	1.6064	0.0169	1.5869	0.0107
36	1.7811	0.0184	1.7596	0.0120
37	1.9767	0.0204	1.9527	0.0134
38	2.2006	0.0225	2.1740	0.0145
39	2.4654	0.0250	2.4360	0.0163
40	2.7954	0.0275	2.7630	0.0181
41	3.2443	0.0303	3.2081	0.0202
42	3.9817	0.0336	3.9414	0.0226

TABLE 21

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= ITBS 12-5 Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.1171	0.0280	-4.0844	0.0261
2	-3.3901	0.0267	-3.3591	0.0254
3	-2.9503	0.0256	-2.9204	0.0245
4	-2.6274	0.0240	-2.5991	0.0238
5	-2.3687	0.0229	-2.3417	0.0229
6	-2.1497	0.0218	-2.1244	0.0222
7	-1.9589	0.0206	-1.9346	0.0212
8	-1.7873	0.0192	-1.7646	0.0207
9	-1.6310	0.0180	-1.6094	0.0195
10	-1.4860	0.0169	-1.4660	0.0189
11	-1.3506	0.0159	-1.3317	0.0181
12	-1.2223	0.0147	-1.2047	0.0172
13	-1.1001	0.0137	-1.0834	0.0161
14	-0.9827	0.0123	-0.9677	0.0154
15	-0.8691	0.0113	-0.8556	0.0144
16	-0.7593	0.0103	-0.7467	0.0134
17	-0.6517	0.0092	-0.6403	0.0126
18	-0.5461	0.0083	-0.5363	0.0117
19	-0.4427	0.0072	-0.4339	0.0108
20	-0.3401	0.0063	-0.3326	0.0096
21	-0.2381	0.0055	-0.2323	0.0086
22	-0.1371	0.0048	-0.1323	0.0077
23	-0.0361	0.0039	-0.0324	0.0066
24	0.0651	0.0032	0.0674	0.0059
25	0.1673	0.0030	0.1683	0.0051
26	0.2700	0.0032	0.2696	0.0046
27	0.3747	0.0036	0.3727	0.0041
28	0.4806	0.0043	0.4771	0.0042
29	0.5889	0.0050	0.5837	0.0046
30	0.6994	0.0062	0.6931	0.0056
31	0.8137	0.0068	0.8059	0.0066
32	0.9317	0.0080	0.9224	0.0079
33	1.0547	0.0088	1.0436	0.0092
34	1.1834	0.0102	1.1703	0.0109
35	1.3190	0.0112	1.3039	0.0126
36	1.4631	0.0128	1.4461	0.0142
37	1.6176	0.0140	1.5989	0.0163
38	1.7857	0.0158	1.7643	0.0186
39	1.9707	0.0179	1.9467	0.0213
40	2.1786	0.0207	2.1514	0.0249
41	2.4171	0.0236	2.3869	0.0291
42	2.7011	0.0283	2.6664	0.0348
43	3.0563	0.0355	3.0164	0.0430
44	3.5396	0.0461	3.4919	0.0555
45	4.3259	0.0629	4.2673	0.0755

TABLE 22

Stability of Parameter Estimates as a Function

of Occurrence in the Design

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Tests= MAT E-F Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.5423	0.0791	-4.4961	0.1013
2	-3.7983	0.0737	-3.7534	0.0954
3	-3.3420	0.0689	-3.2983	0.0895
4	-3.0036	0.0641	-2.9611	0.0838
5	-2.7297	0.0599	-2.6887	0.0785
6	-2.4970	0.0557	-2.4570	0.0732
7	-2.2920	0.0524	-2.2534	0.0683
8	-2.1080	0.0490	-2.0706	0.0633
9	-1.9391	0.0460	-1.9030	0.0589
10	-1.7826	0.0430	-1.7479	0.0543
11	-1.6359	0.0404	-1.6026	0.0505
12	-1.4971	0.0379	-1.4651	0.0466
13	-1.3647	0.0357	-1.3343	0.0423
14	-1.2377	0.0334	-1.2090	0.0387
15	-1.1157	0.0313	-1.0884	0.0352
16	-0.9973	0.0293	-0.9714	0.0320
17	-0.8823	0.0275	-0.8579	0.0284
18	-0.7694	0.0258	-0.7470	0.0253
19	-0.6590	0.0237	-0.6384	0.0222
20	-0.5504	0.0223	-0.5317	0.0195
21	-0.4433	0.0208	-0.4267	0.0171
22	-0.3374	0.0195	-0.3223	0.0146
23	-0.2320	0.0180	-0.2191	0.0128
24	-0.1271	0.0168	-0.1166	0.0113
25	-0.0224	0.0161	-0.0139	0.0106
26	0.0824	0.0153	0.0886	0.0109
27	0.1877	0.0150	0.1914	0.0119
28	0.2937	0.0148	0.2951	0.0136
29	0.4010	0.0153	0.3999	0.0158
30	0.5094	0.0159	0.5056	0.0181
31	0.6196	0.0172	0.6131	0.0206
32	0.7321	0.0185	0.7229	0.0235
33	0.8467	0.0202	0.8349	0.0263
34	0.9650	0.0225	0.9500	0.0294
35	1.0869	0.0248	1.0684	0.0327
36	1.2130	0.0271	1.1914	0.0362
37	1.3443	0.0304	1.3193	0.0398
38	1.4816	0.0335	1.4530	0.0436
39	1.6261	0.0372	1.5939	0.0477
40	1.7791	0.0409	1.7431	0.0522
41	1.9431	0.0459	1.9031	0.0568
42	2.1201	0.0506	2.0757	0.0619
43	2.3136	0.0560	2.2653	0.0674
44	2.5289	0.0623	2.4757	0.0735
45	2.7734	0.0687	2.7156	0.0799
46	3.0597	0.0763	2.9974	0.0874
47	3.4123	0.0846	3.3453	0.0955
48	3.8834	0.0933	3.8123	0.1041
49	4.6437	0.1030	4.5687	0.1141

TABLE 23

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= MAT I-F Occurrences= 11 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.5762	0.0677	-4.4899	0.0534
2	-3.8226	0.0624	-3.7433	0.0490
3	-3.3585	0.0576	-3.2855	0.0452
4	-3.0137	0.0536	-2.9459	0.0419
5	-2.7345	0.0496	-2.6717	0.0388
6	-2.4971	0.0459	-2.4386	0.0359
7	-2.2885	0.0427	-2.2343	0.0335
8	-2.1008	0.0396	-2.0503	0.0311
9	-1.9292	0.0365	-1.8823	0.0289
10	-1.7710	0.0338	-1.7266	0.0268
11	-1.6211	0.0311	-1.5811	0.0251
12	-1.4805	0.0286	-1.4435	0.0233
13	-1.3462	0.0261	-1.3124	0.0218
14	-1.2176	0.0239	-1.1869	0.0201
15	-1.0940	0.0217	-1.0660	0.0187
16	-0.9739	0.0194	-0.9493	0.0171
17	-0.8575	0.0172	-0.8353	0.0157
18	-0.7435	0.0154	-0.7243	0.0142
19	-0.6322	0.0133	-0.6157	0.0130
20	-0.5224	0.0114	-0.5088	0.0118
21	-0.4143	0.0097	-0.4033	0.0107
22	-0.3071	0.0083	-0.2993	0.0096
23	-0.2011	0.0074	-0.1961	0.0088
24	-0.0955	0.0066	-0.0932	0.0083
25	0.0097	0.0070	0.0094	0.0080
26	0.1150	0.0080	0.1115	0.0078
27	0.2205	0.0094	0.2145	0.0083
28	0.3265	0.0110	0.3176	0.0090
29	0.4334	0.0127	0.4215	0.0098
30	0.5413	0.0148	0.5264	0.0112
31	0.6505	0.0168	0.6327	0.0125
32	0.7615	0.0188	0.7409	0.0141
33	0.8747	0.0208	0.8511	0.0156
34	0.9906	0.0231	0.9641	0.0172
35	1.1095	0.0251	1.0798	0.0189
36	1.2321	0.0270	1.1994	0.0209
37	1.3590	0.0291	1.3230	0.0225
38	1.4913	0.0311	1.4521	0.0245
39	1.6296	0.0333	1.5875	0.0265
40	1.7757	0.0351	1.7304	0.0283
41	1.9316	0.0371	1.8829	0.0303
42	2.0991	0.0392	2.0470	0.0320
43	2.2818	0.0409	2.2266	0.0342
44	2.4849	0.0426	2.4261	0.0363
45	2.7156	0.0444	2.6535	0.0383
46	2.9868	0.0463	2.9212	0.0400
47	3.3220	0.0480	3.2529	0.0424
48	3.7748	0.0492	3.7021	0.0446
49	4.5149	0.0510	4.4384	0.0465

TABLE 24

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= STEP 4-A Occurrences= 14 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.1856	0.0651	-4.0365	0.0555
2	-3.4041	0.0600	-3.2661	0.0513
3	-2.9094	0.0555	-2.7815	0.0474
4	-2.5312	0.0519	-2.4129	0.0439
5	-2.2159	0.0481	-2.1071	0.0402
6	-1.9393	0.0447	-1.8400	0.0370
7	-1.6886	0.0417	-1.5986	0.0334
8	-1.4559	0.0384	-1.3756	0.0299
9	-1.2361	0.0352	-1.1652	0.0264
10	-1.0256	0.0321	-0.9644	0.0231
11	-0.8218	0.0287	-0.7702	0.0198
12	-0.6222	0.0255	-0.5810	0.0169
13	-0.4252	0.0222	-0.3946	0.0142
14	-0.2296	0.0189	-0.2097	0.0121
15	-0.0341	0.0161	-0.0255	0.0112
16	0.1629	0.0140	0.1601	0.0113
17	0.3622	0.0138	0.3474	0.0130
18	0.5654	0.0156	0.5381	0.0151
19	0.7735	0.0190	0.7336	0.0179
20	0.9880	0.0238	0.9349	0.0212
21	1.2106	0.0294	1.1444	0.0248
22	1.4438	0.0355	1.3644	0.0286
23	1.6906	0.0418	1.5982	0.0327
24	1.9557	0.0485	1.8504	0.0371
25	2.2466	0.0552	2.1289	0.0417
26	2.5759	0.0618	2.4460	0.0467
27	2.9673	0.0686	2.8255	0.0518
28	3.4736	0.0753	3.3206	0.0571
29	4.2649	0.0822	4.1008	0.0625

TABLE 25

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SRA BL-E Occurrences= 10 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.0713	0.0428	-4.0295	0.0443
2	-3.3313	0.0397	-3.2914	0.0409
3	-2.8792	0.0369	-2.8417	0.0378
4	-2.5447	0.0344	-2.5094	0.0350
5	-2.2750	0.0318	-2.2416	0.0322
6	-2.0459	0.0295	-2.0144	0.0301
7	-1.8446	0.0271	-1.8151	0.0276
8	-1.6632	0.0250	-1.6361	0.0257
9	-1.4976	0.0228	-1.4724	0.0235
10	-1.3437	0.0208	-1.3205	0.0216
11	-1.1990	0.0186	-1.1779	0.0198
12	-1.0620	0.0166	-1.0429	0.0177
13	-0.9311	0.0149	-0.9140	0.0160
14	-0.8051	0.0129	-0.7900	0.0143
15	-0.6832	0.0110	-0.6700	0.0127
16	-0.5643	0.0093	-0.5533	0.0109
17	-0.4480	0.0075	-0.4390	0.0094
18	-0.3338	0.0059	-0.3268	0.0078
19	-0.2210	0.0040	-0.2159	0.0064
20	-0.1090	0.0027	-0.1060	0.0053
21	0.0024	0.0021	0.0034	0.0043
22	0.1141	0.0031	0.1127	0.0044
23	0.2261	0.0045	0.2227	0.0050
24	0.3389	0.0063	0.3332	0.0061
25	0.4531	0.0082	0.4453	0.0077
26	0.5692	0.0100	0.5594	0.0092
27	0.6880	0.0116	0.6759	0.0110
28	0.8097	0.0134	0.7956	0.0130
29	0.9353	0.0155	0.9190	0.0151
30	1.0660	0.0174	1.0473	0.0170
31	1.2026	0.0193	1.1816	0.0192
32	1.3466	0.0211	1.3234	0.0214
33	1.4996	0.0231	1.4748	0.0227
34	1.6644	0.0251	1.6370	0.0249
35	1.8443	0.0272	1.8143	0.0285
36	2.0439	0.0291	2.0118	0.0311
37	2.2714	0.0312	2.2369	0.0336
38	2.5390	0.0335	2.5022	0.0367
39	2.8709	0.0358	2.8317	0.0397
40	3.3199	0.0378	3.2779	0.0448
41	4.0561	0.0404	4.0119	0.0483

TABLE 26

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SRA GR-E Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.1061	0.0382	-4.0857	0.0566
2	-3.3637	0.0362	-3.3436	0.0524
3	-2.9087	0.0343	-2.8896	0.0486
4	-2.5713	0.0323	-2.5530	0.0449
5	-2.2984	0.0300	-2.2913	0.0411
6	-2.0663	0.0284	-2.0503	0.0376
7	-1.8619	0.0261	-1.8471	0.0345
8	-1.6780	0.0242	-1.6643	0.0314
9	-1.5091	0.0218	-1.4971	0.0284
10	-1.3526	0.0198	-1.3414	0.0256
11	-1.2053	0.0178	-1.1956	0.0225
12	-1.0661	0.0157	-1.0574	0.0202
13	-0.9324	0.0134	-0.9254	0.0172
14	-0.8046	0.0115	-0.7986	0.0149
15	-0.6801	0.0096	-0.6757	0.0123
16	-0.5596	0.0077	-0.5563	0.0098
17	-0.4414	0.0058	-0.4393	0.0079
18	-0.3259	0.0043	-0.3247	0.0058
19	-0.2114	0.0028	-0.2113	0.0045
20	-0.0983	0.0024	-0.0990	0.0037
21	0.0141	0.0033	0.0123	0.0045
22	0.1266	0.0051	0.1237	0.0062
23	0.2391	0.0062	0.2356	0.0078
24	0.3526	0.0081	0.3479	0.0100
25	0.4673	0.0096	0.4619	0.0120
26	0.5834	0.0115	0.5774	0.0139
27	0.7020	0.0129	0.6851	0.0161
28	0.8239	0.0144	0.8159	0.0180
29	0.9491	0.0160	0.9407	0.0201
30	1.0793	0.0175	1.0701	0.0223
31	1.2153	0.0190	1.2053	0.0244
32	1.3584	0.0206	1.3476	0.0264
33	1.5107	0.0215	1.4991	0.0285
34	1.6741	0.0233	1.6620	0.0306
35	1.8530	0.0245	1.8401	0.0329
36	2.0513	0.0257	2.0377	0.0354
37	2.2771	0.0269	2.2629	0.0377
38	2.5431	0.0283	2.5280	0.0401
39	2.8733	0.0293	2.8574	0.0426
40	3.3204	0.0307	3.3040	0.0457
41	4.0551	0.0317	4.0376	0.0489

TABLE 27

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SAT I-W Occurrences= 7 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.2636	0.0412	-4.1257	0.0552
2	-3.5084	0.0379	-3.3761	0.0499
3	-3.0407	0.0352	-2.9134	0.0456
4	-2.6900	0.0327	-2.5681	0.0415
5	-2.4030	0.0309	-2.2869	0.0377
6	-2.1557	0.0288	-2.0453	0.0344
7	-1.9357	0.0266	-1.8314	0.0314
8	-1.7354	0.0247	-1.6374	0.0283
9	-1.5499	0.0230	-1.4579	0.0256
10	-1.3753	0.0209	-1.2900	0.0232
11	-1.2094	0.0193	-1.1306	0.0205
12	-1.0500	0.0176	-0.9781	0.0178
13	-0.8960	0.0156	-0.8311	0.0156
14	-0.7463	0.0137	-0.6887	0.0134
15	-0.5993	0.0116	-0.5494	0.0110
16	-0.4547	0.0099	-0.4126	0.0088
17	-0.3114	0.0082	-0.2776	0.0067
18	-0.1690	0.0066	-0.1433	0.0051
19	-0.0266	0.0057	-0.0097	0.0047
20	0.1161	0.0055	0.1240	0.0050
21	0.2601	0.0066	0.2589	0.0067
22	0.4060	0.0079	0.3947	0.0089
23	0.5543	0.0099	0.5329	0.0111
24	0.7060	0.0117	0.6741	0.0136
25	0.8614	0.0137	0.8189	0.0159
26	1.0219	0.0161	0.9680	0.0187
27	1.1884	0.0185	1.1230	0.0214
28	1.3626	0.0205	1.2856	0.0239
29	1.5460	0.0229	1.4567	0.0267
30	1.7410	0.0253	1.6393	0.0294
31	1.9511	0.0276	1.8374	0.0322
32	2.1811	0.0301	2.0550	0.0352
33	2.4384	0.0324	2.2997	0.0380
34	2.7357	0.0350	2.5849	0.0413
35	3.0964	0.0373	2.9337	0.0445
36	3.5740	0.0395	3.3997	0.0476
37	4.3380	0.0420	4.1526	0.0509

TABLE 28

Stability of Parameter Estimates as a Function of Occurrence in the Design

Tests= SAT II-W Occurrences= 11 Parameters= ABILITY

Item or Score Group	First Tests Mean	First Tests Std. Dev.	Second Tests Mean	Second Tests Std. Dev.
1	-4.5909	0.0757	-4.4430	0.0689
2	-3.8367	0.0712	-3.6946	0.0633
3	-3.3709	0.0667	-3.2347	0.0581
4	-3.0232	0.0624	-2.8929	0.0534
5	-2.7406	0.0583	-2.6160	0.0489
6	-2.4989	0.0547	-2.3803	0.0451
7	-2.2857	0.0513	-2.1729	0.0413
8	-2.0937	0.0478	-1.9865	0.0377
9	-1.9174	0.0448	-1.8161	0.0345
10	-1.7535	0.0416	-1.6582	0.0314
11	-1.5998	0.0385	-1.5101	0.0287
12	-1.4543	0.0359	-1.3703	0.0261
13	-1.3157	0.0332	-1.2369	0.0239
14	-1.1825	0.0307	-1.1095	0.0217
15	-1.0541	0.0280	-0.9867	0.0196
16	-0.9299	0.0256	-0.8680	0.0178
17	-0.8086	0.0234	-0.7525	0.0158
18	-0.6903	0.0211	-0.6399	0.0143
19	-0.5741	0.0187	-0.5293	0.0128
20	-0.4597	0.0167	-0.4205	0.0116
21	-0.3468	0.0146	-0.3135	0.0104
22	-0.2347	0.0126	-0.2073	0.0095
23	-0.1235	0.0107	-0.1018	0.0089
24	-0.0123	0.0091	0.0031	0.0086
25	0.0991	0.0079	0.1082	0.0085
26	0.2108	0.0076	0.2132	0.0089
27	0.3234	0.0083	0.3193	0.0097
28	0.4373	0.0096	0.4261	0.0106
29	0.5521	0.0116	0.5342	0.0119
30	0.6692	0.0138	0.6441	0.0133
31	0.7886	0.0165	0.7561	0.0148
32	0.9110	0.0194	0.8706	0.0166
33	1.0369	0.0225	0.9887	0.0183
34	1.1670	0.0258	1.1103	0.0203
35	1.3021	0.0291	1.2365	0.0224
36	1.4428	0.0328	1.3686	0.0246
37	1.5906	0.0368	1.5074	0.0270
38	1.7474	0.0410	1.6541	0.0298
39	1.9144	0.0455	1.8110	0.0328
40	2.0945	0.0504	1.9805	0.0360
41	2.2914	0.0557	2.1660	0.0400
42	2.5098	0.0613	2.3726	0.0442
43	2.7584	0.0675	2.6085	0.0491
44	3.0495	0.0744	2.8861	0.0552
45	3.4082	0.0828	3.2296	0.0622
46	3.8876	0.0924	3.6931	0.0707
47	4.6598	0.1042	4.4466	0.0814

Appendix B

Stability of Ability Estimates as a Function of Sample Composition

Figure 3.4.1

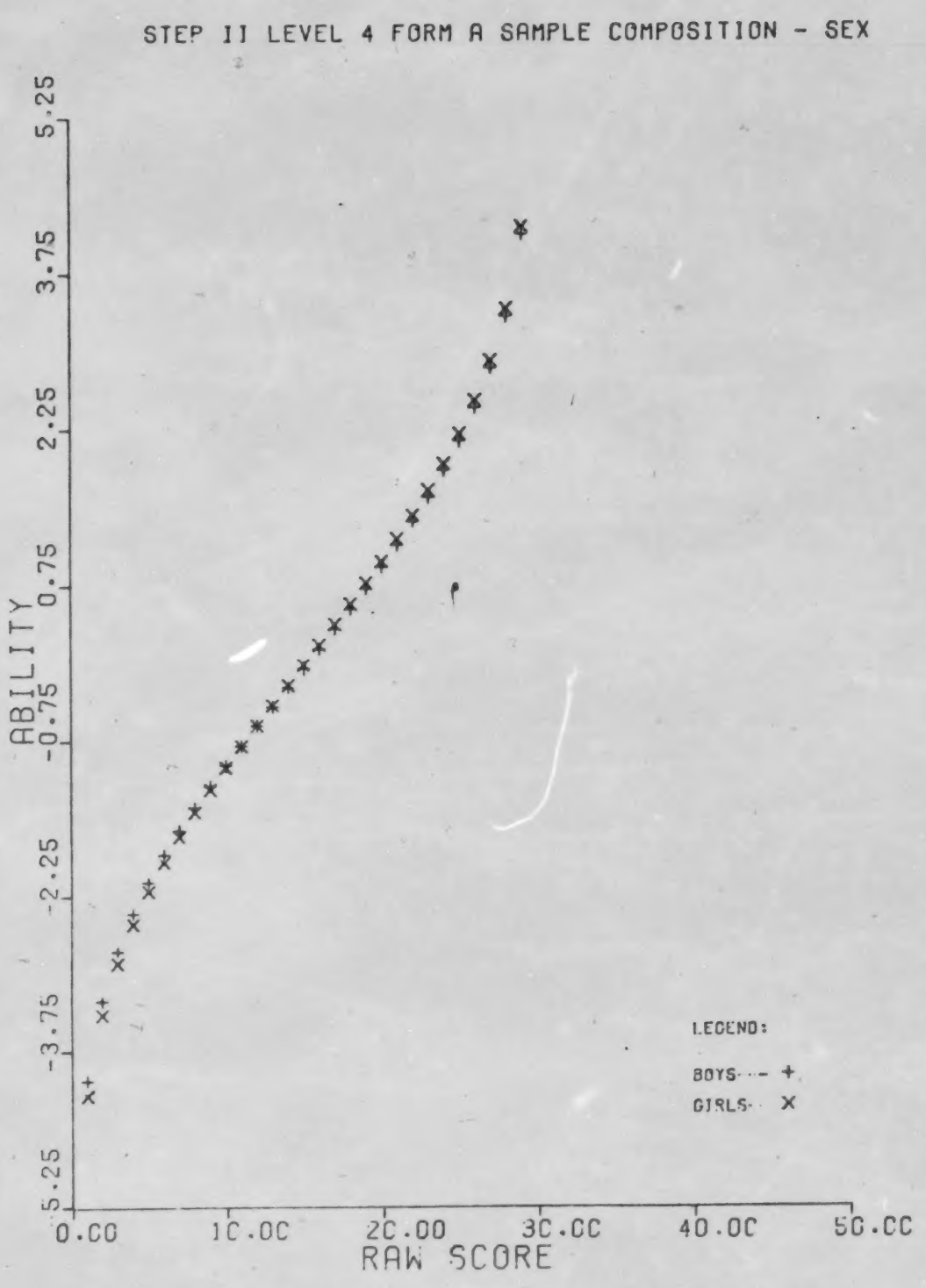

STEP II LEVEL 4 FORM A SAMPLE COMPOSITION - SEX
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BOYS + +
GIRLS X

Figure 3.4.2

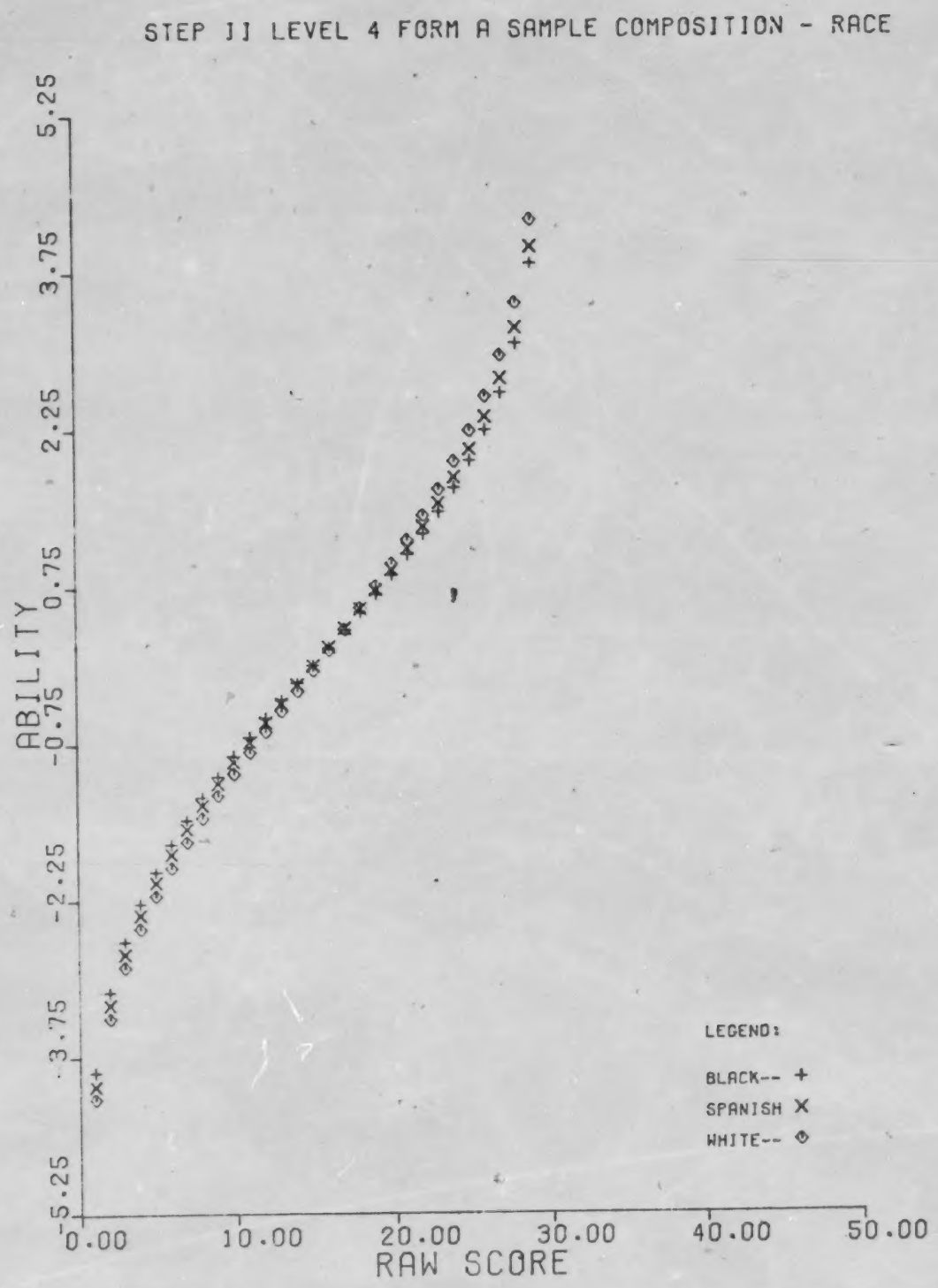

STEP II LEVEL 4 FORM A SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.3

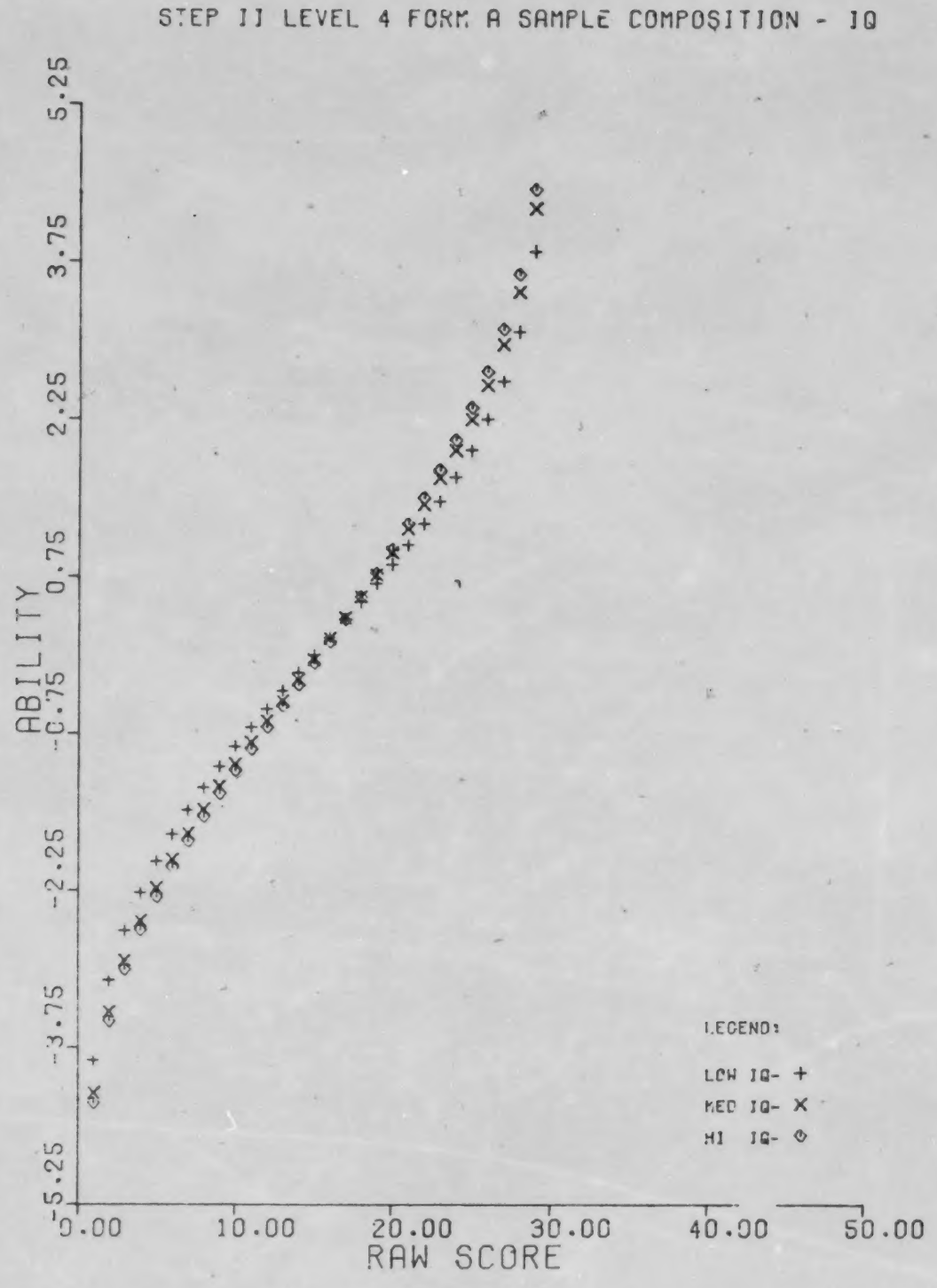

STEP II LEVEL 4 FORM A SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.4

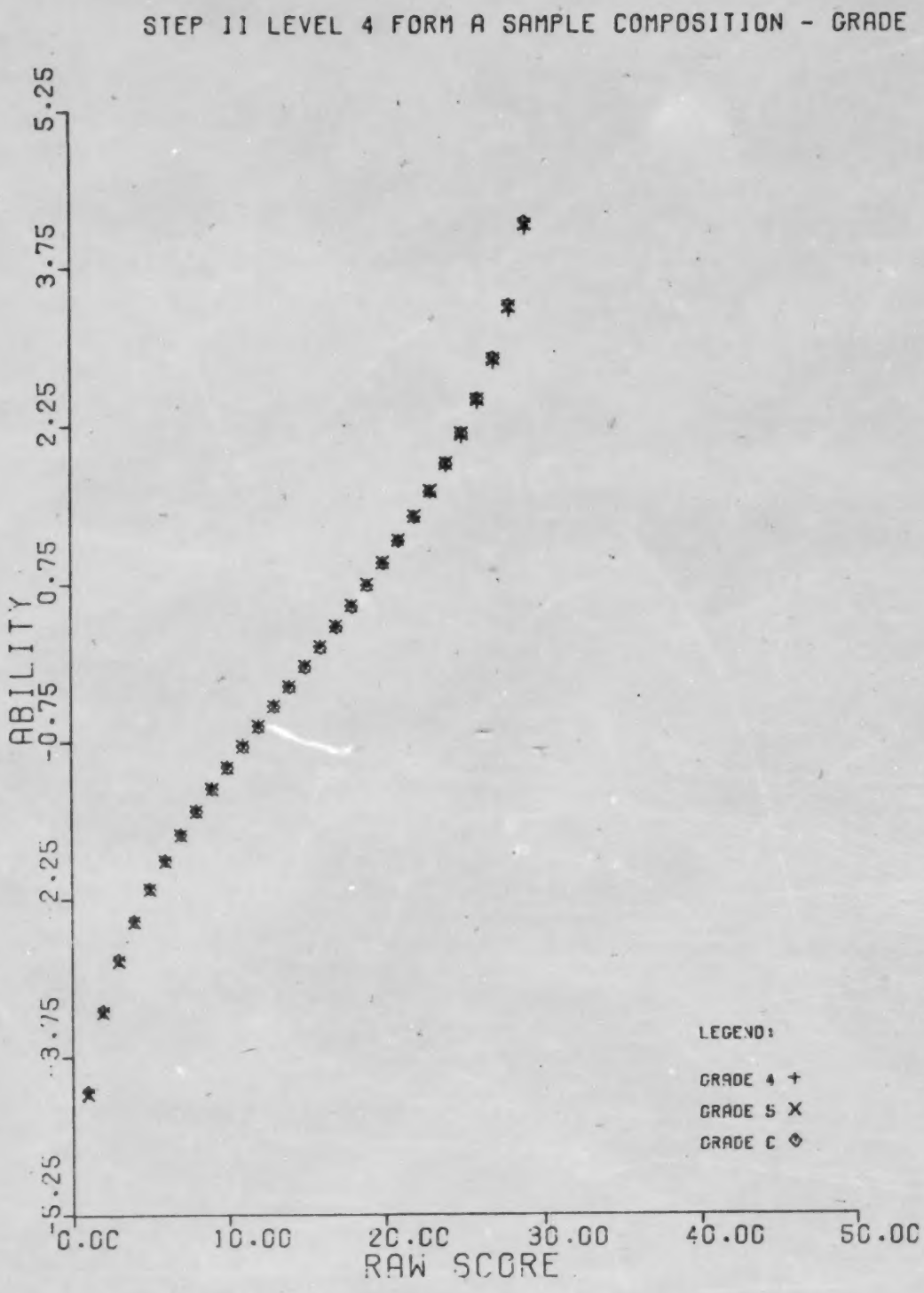

STEP II LEVEL 4 FORM A SAMPLE COMPOSITION - GRADE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
GRADE 4 +
GRADE 5 X
GRADE C ◇

Figure 3.4.5

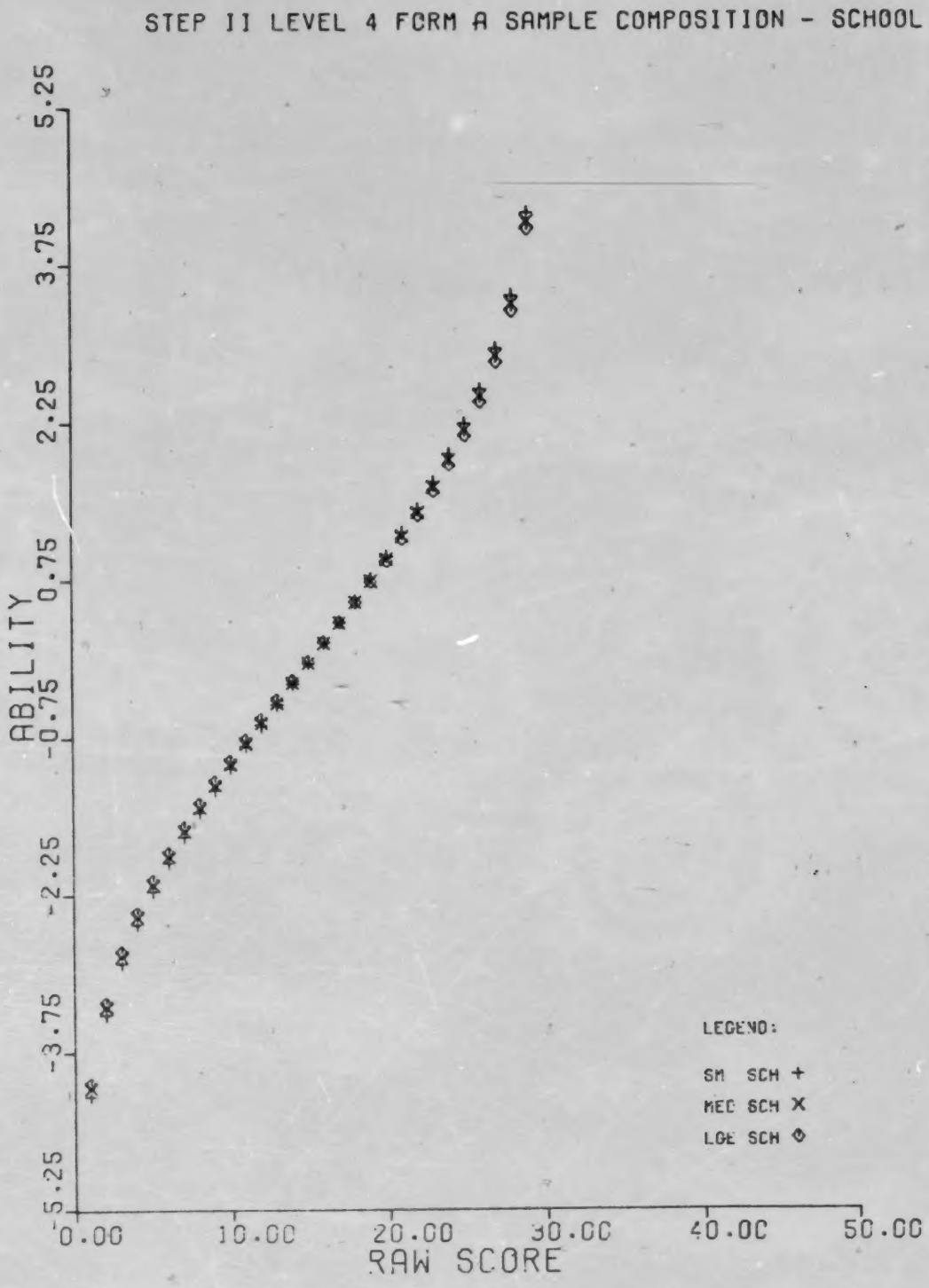

STEP II LEVEL 4 FORM A SAMPLE COMPOSITION - SCHOOL SIZE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
SM SCH +
MED SCH X
LGE SCH ◇

Figure 3.4.6

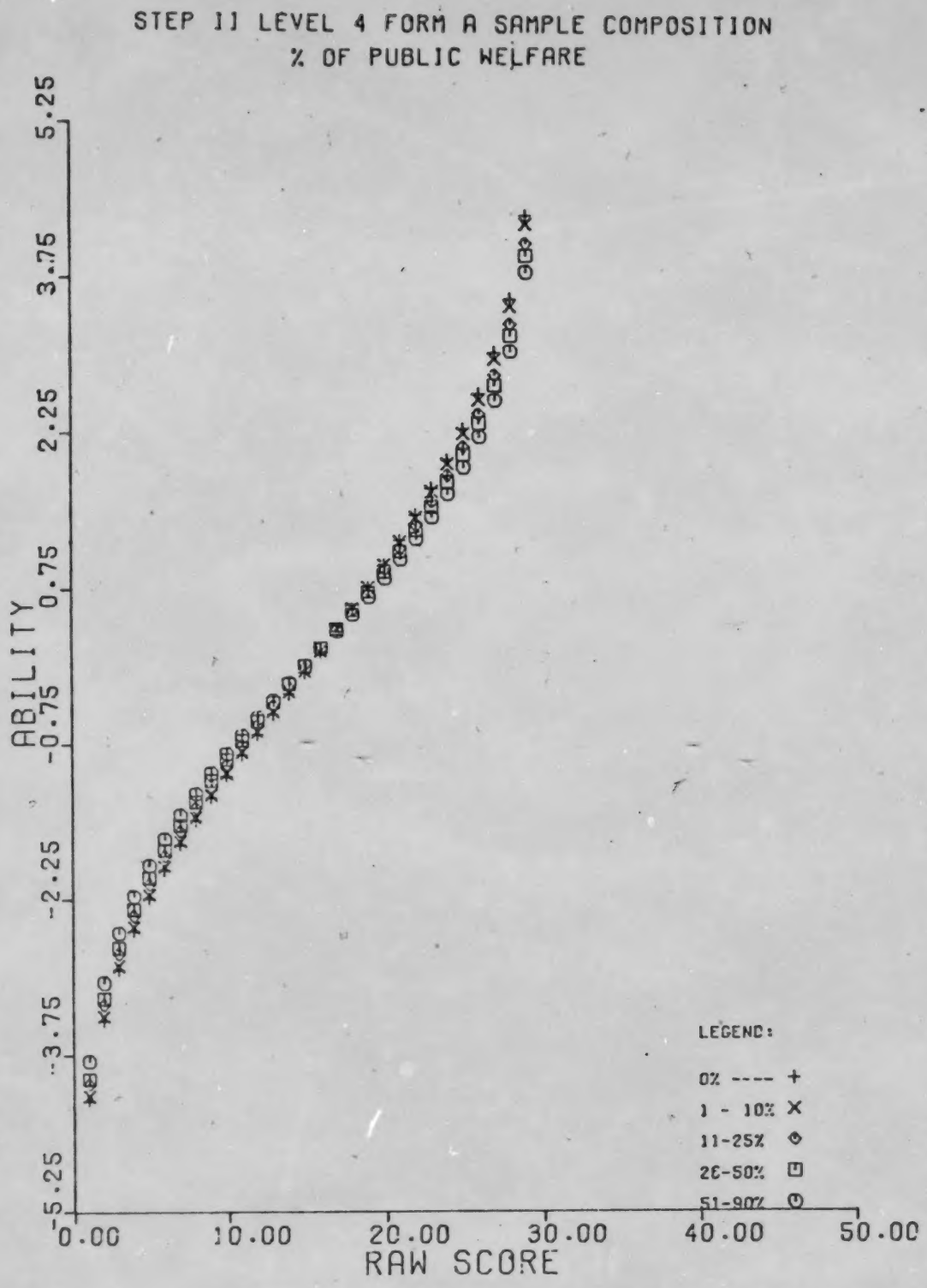

STEP 11 LEVEL 4 FORM A SAMPLE COMPOSITION
% OF PUBLIC WELFARE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
0% ---- +
1 - 10% X
11-25% ◇
26-50% □
51-90% ○

Figure 3.4.7

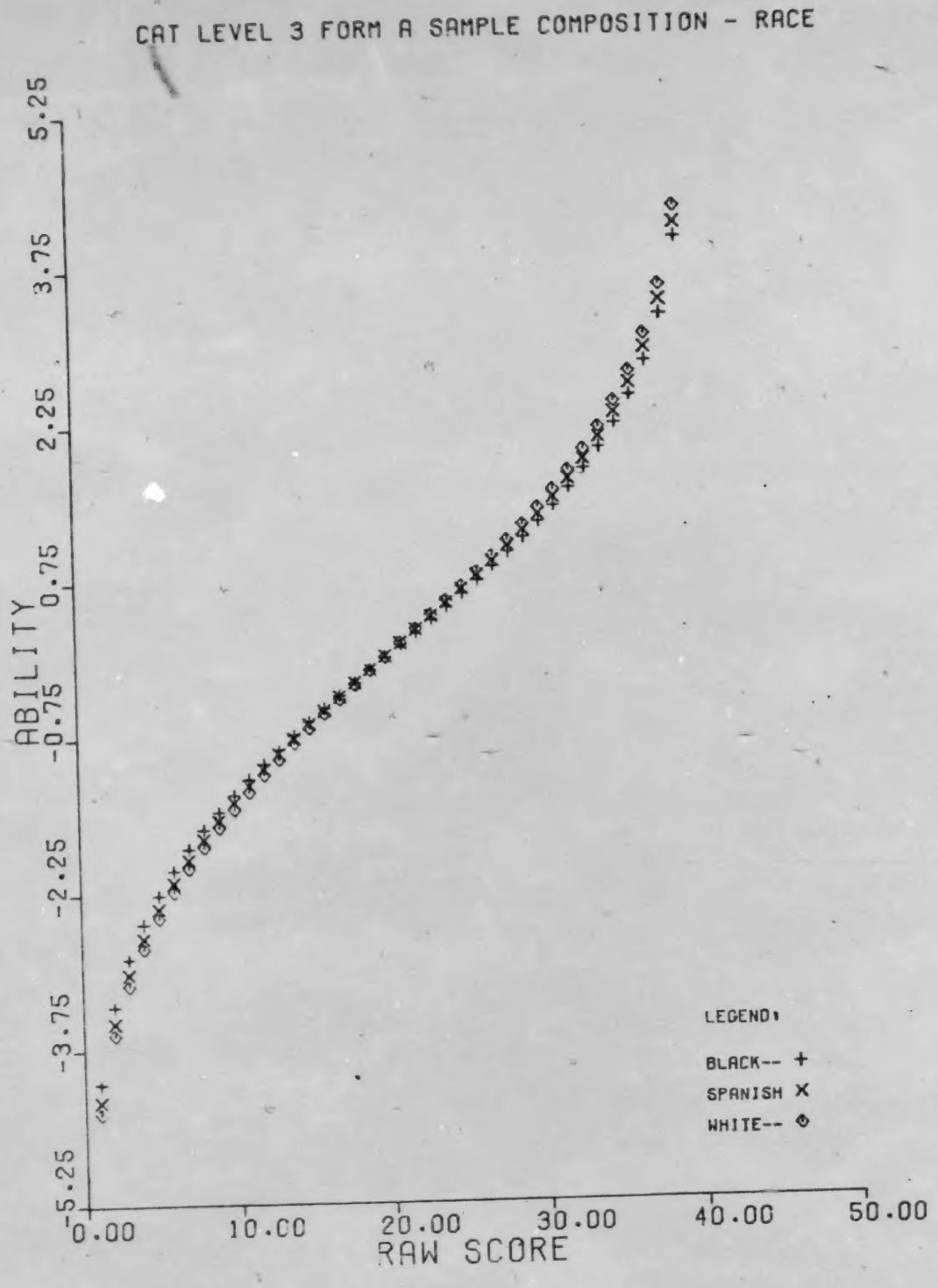

CAT LEVEL 3 FORM A SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.8

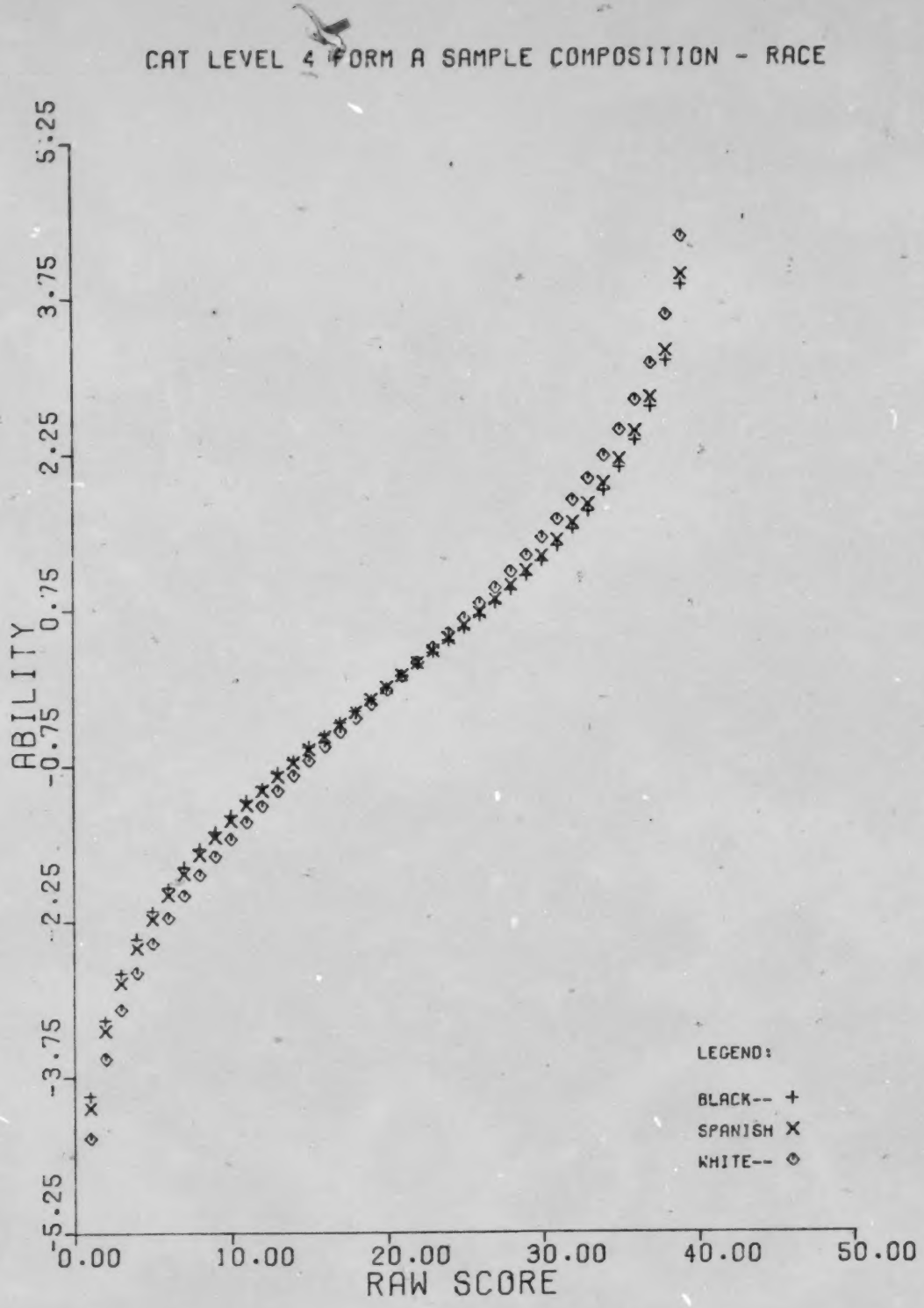

CAT LEVEL 4 FORM A SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.9

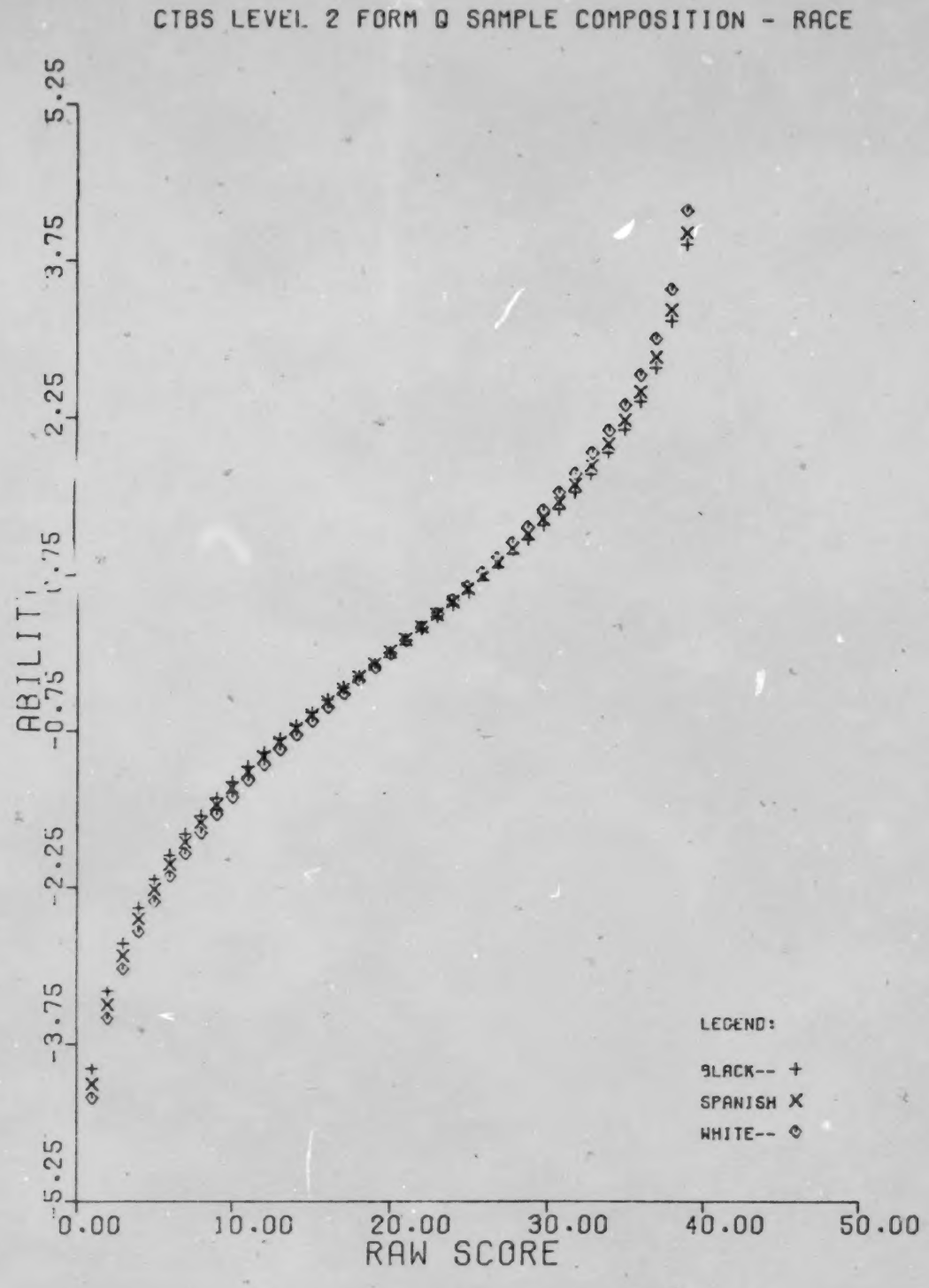

CTBS LEVEL 2 FORM Q SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.10

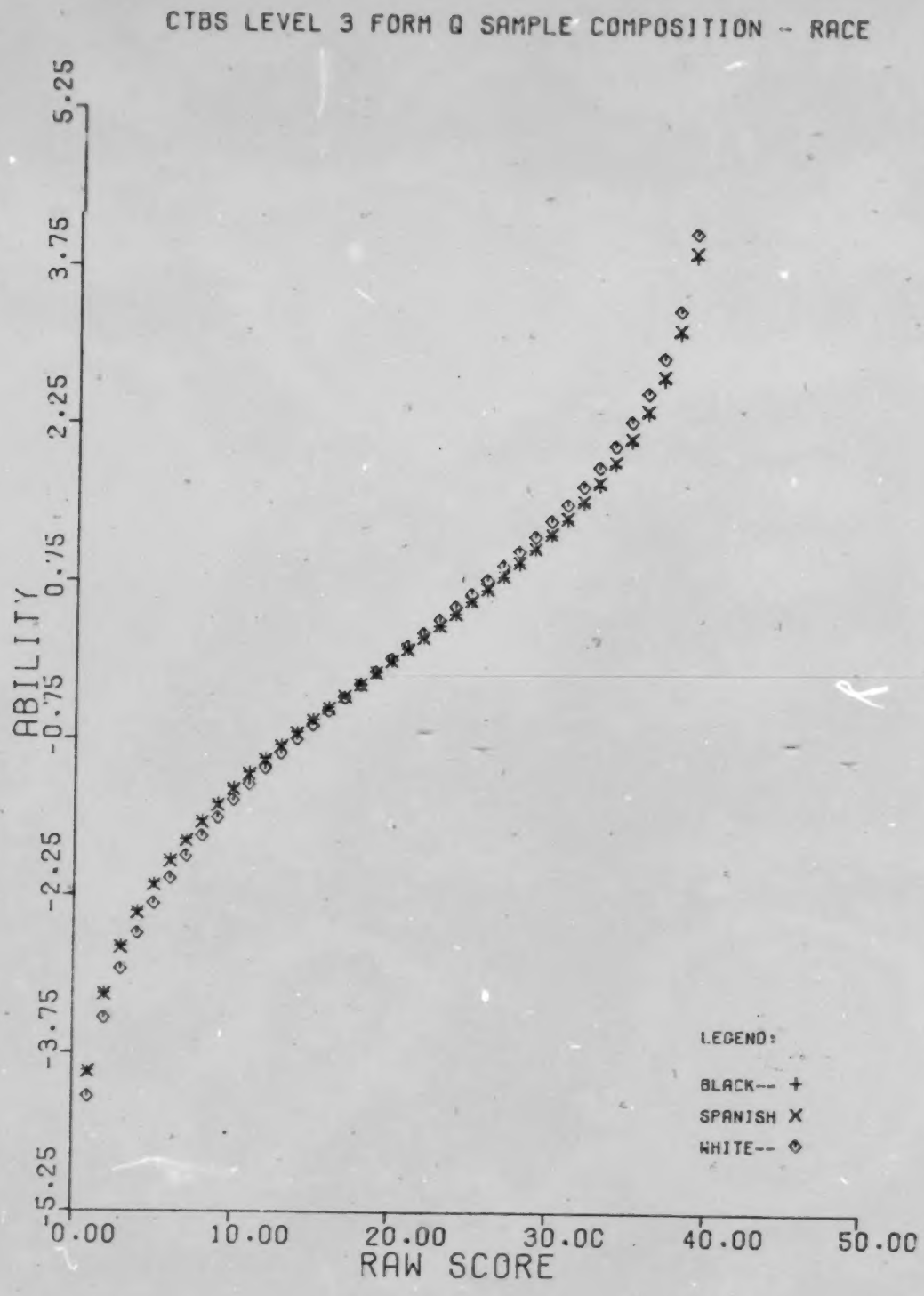

CTBS LEVEL 3 FORM Q SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.11

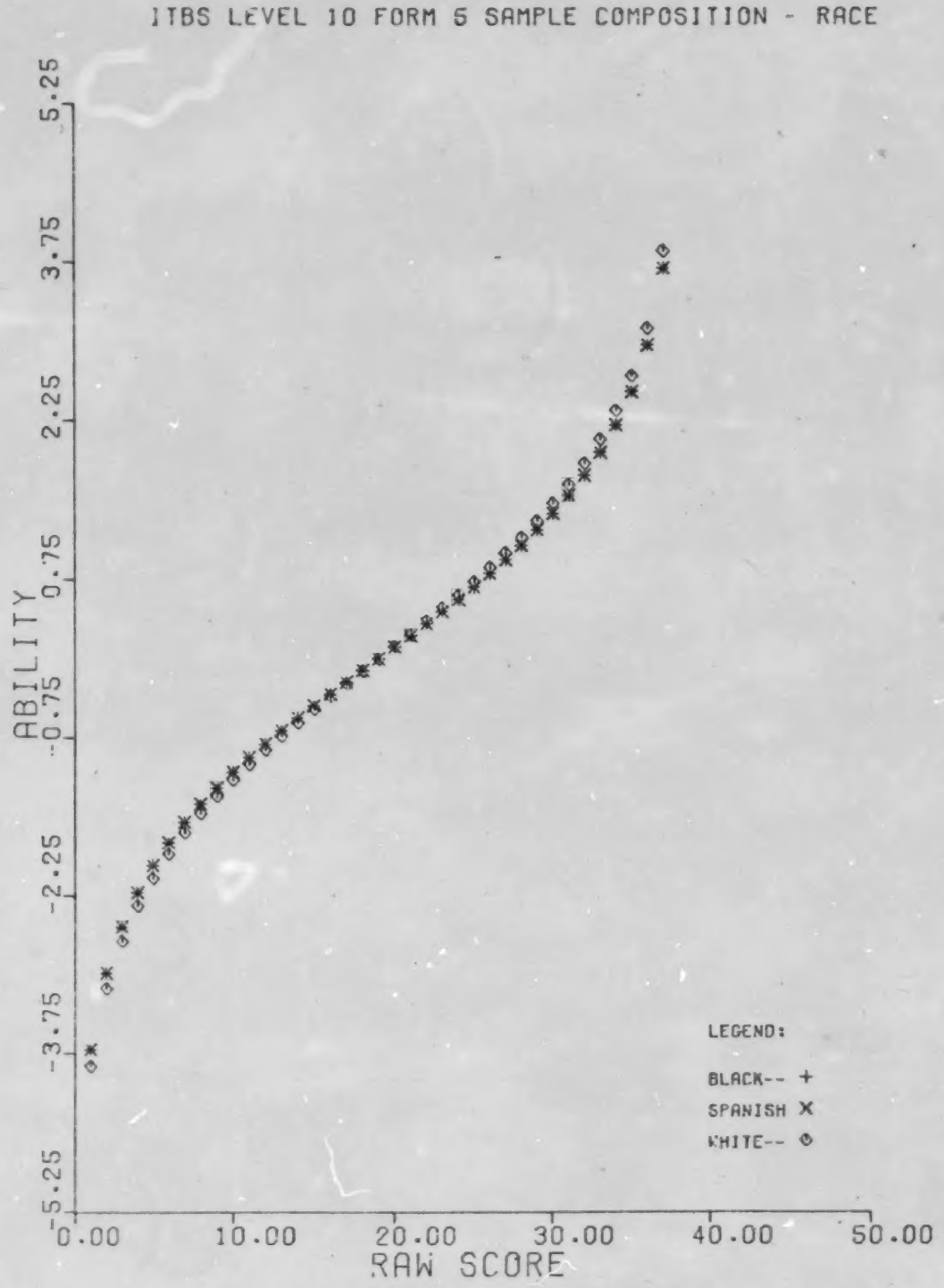

ITBS LEVEL 10 FORM 5 SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.12

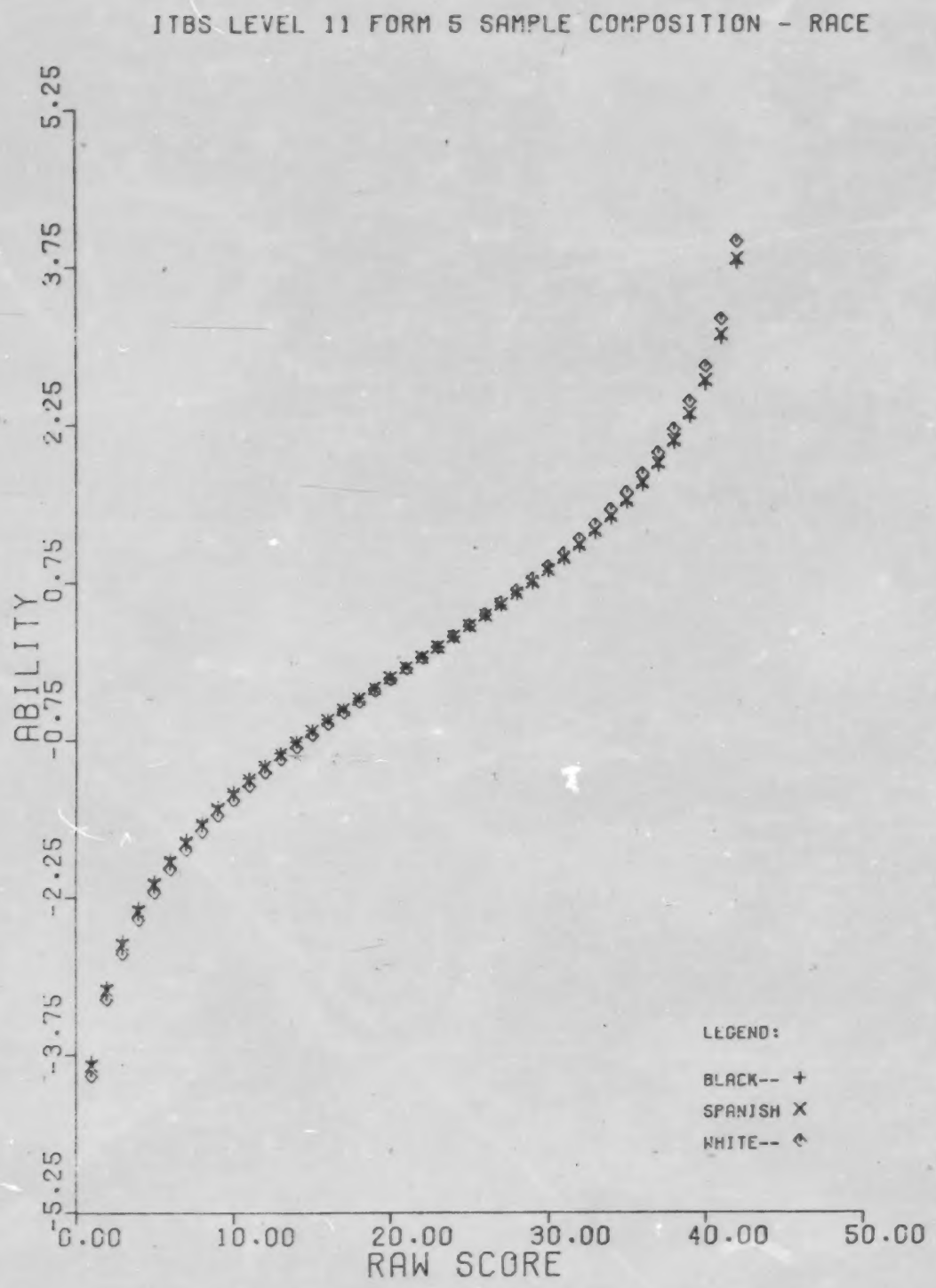

ITBS LEVEL 11 FORM 5 SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.13

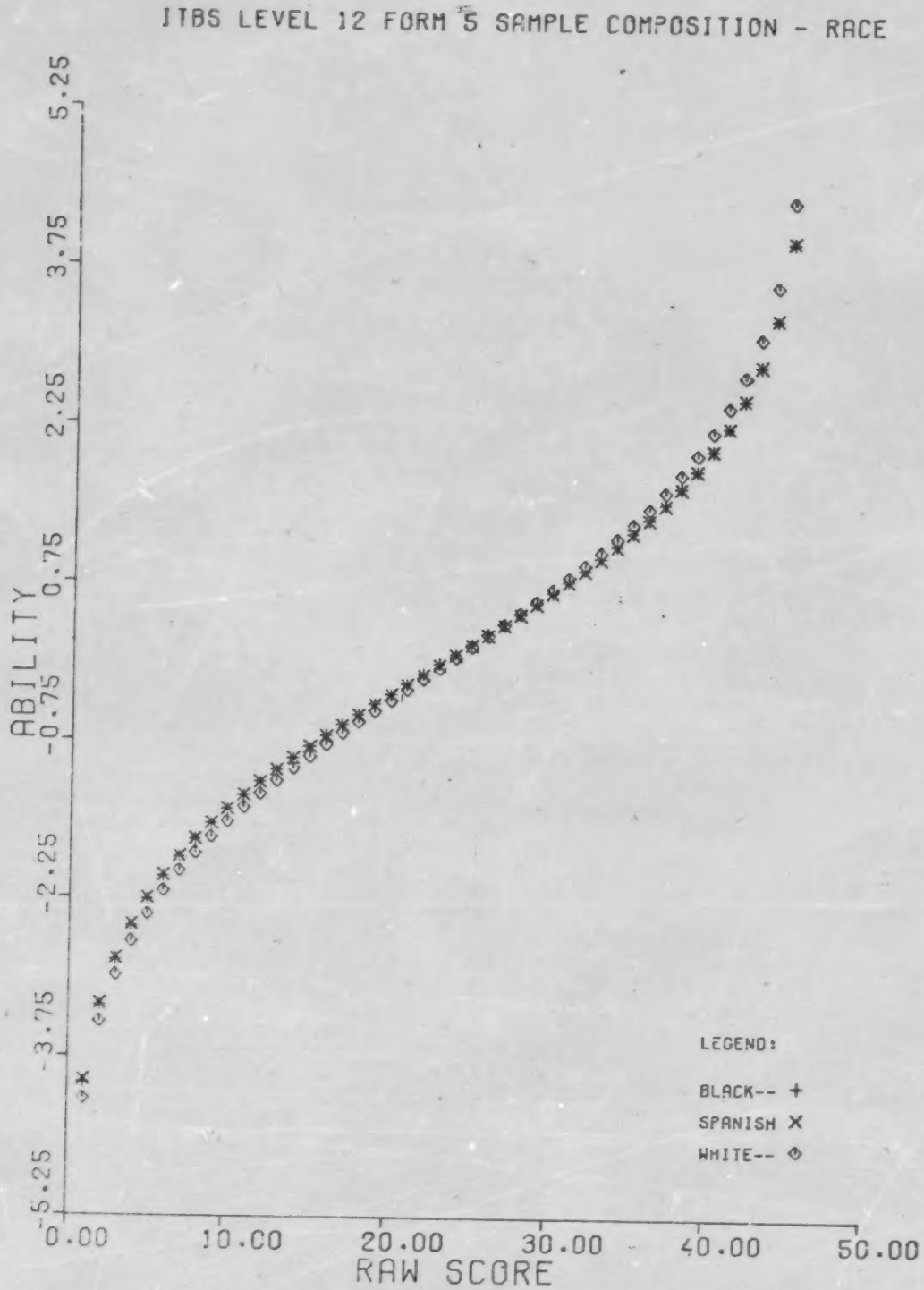

ITBS LEVEL 12 FORM 5 SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.14

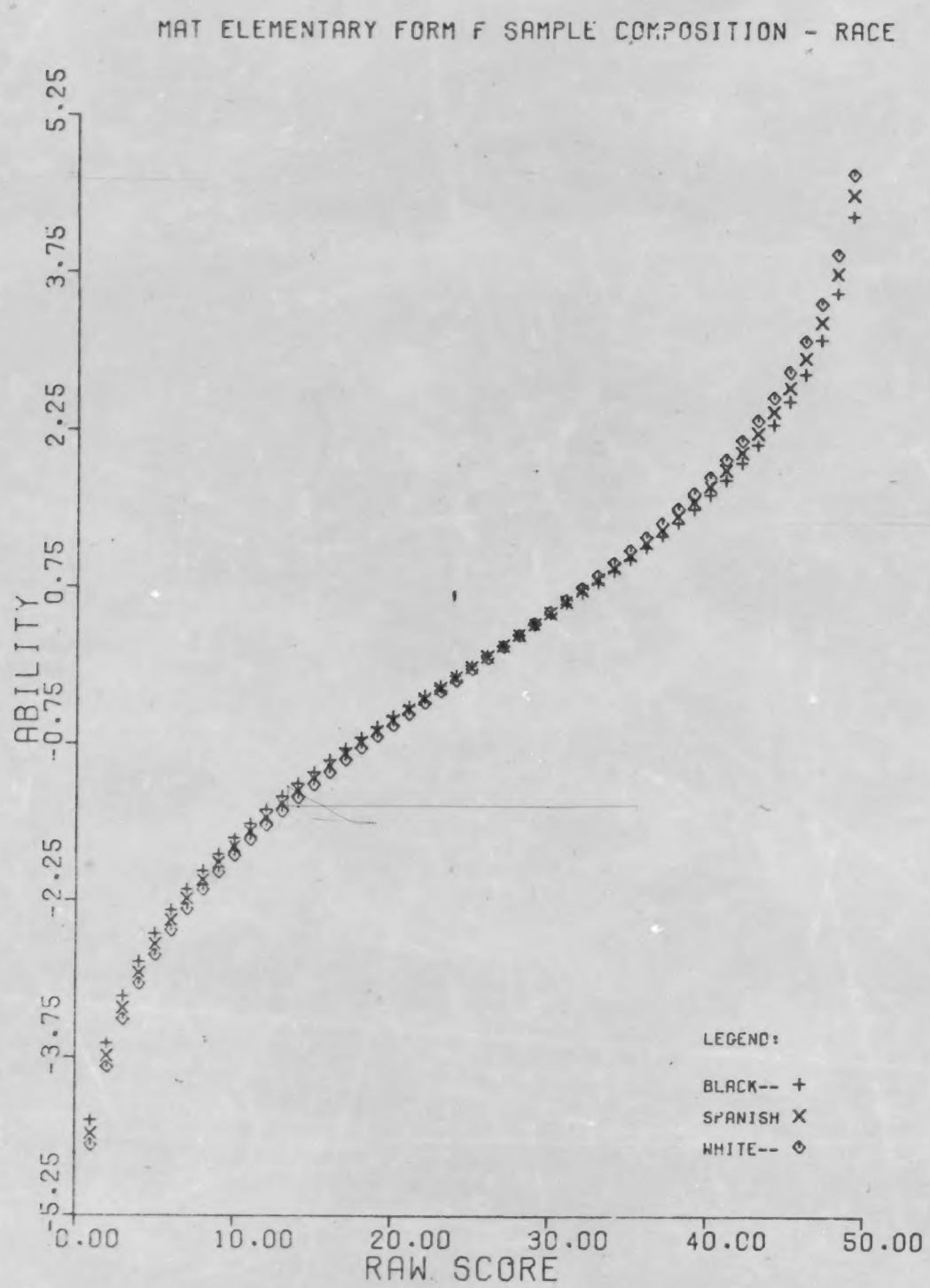

MAT ELEMENTARY FORM F SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.15

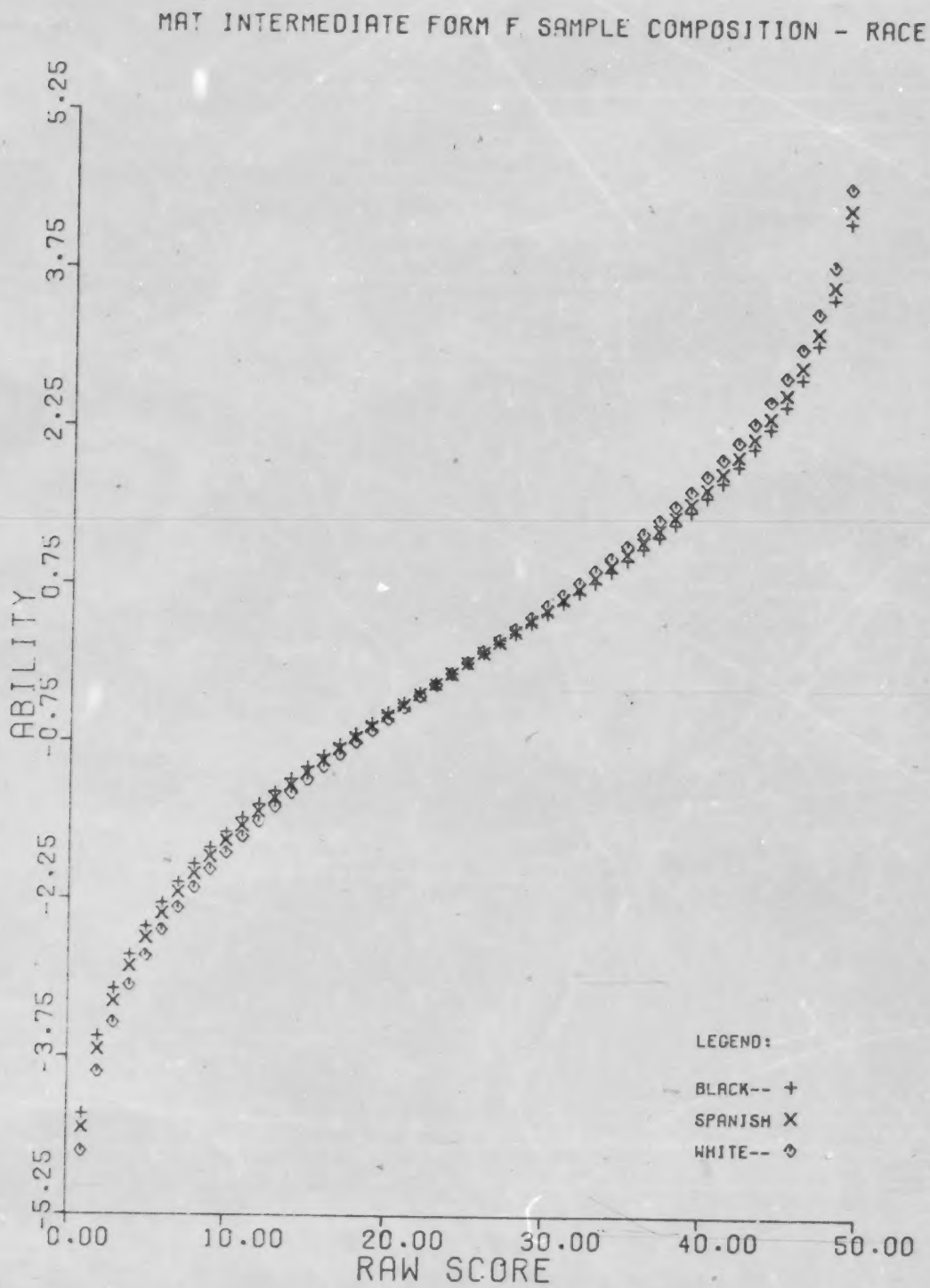

MAT INTERMEDIATE FORM F SAMPLE COMPOSITION - RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.16

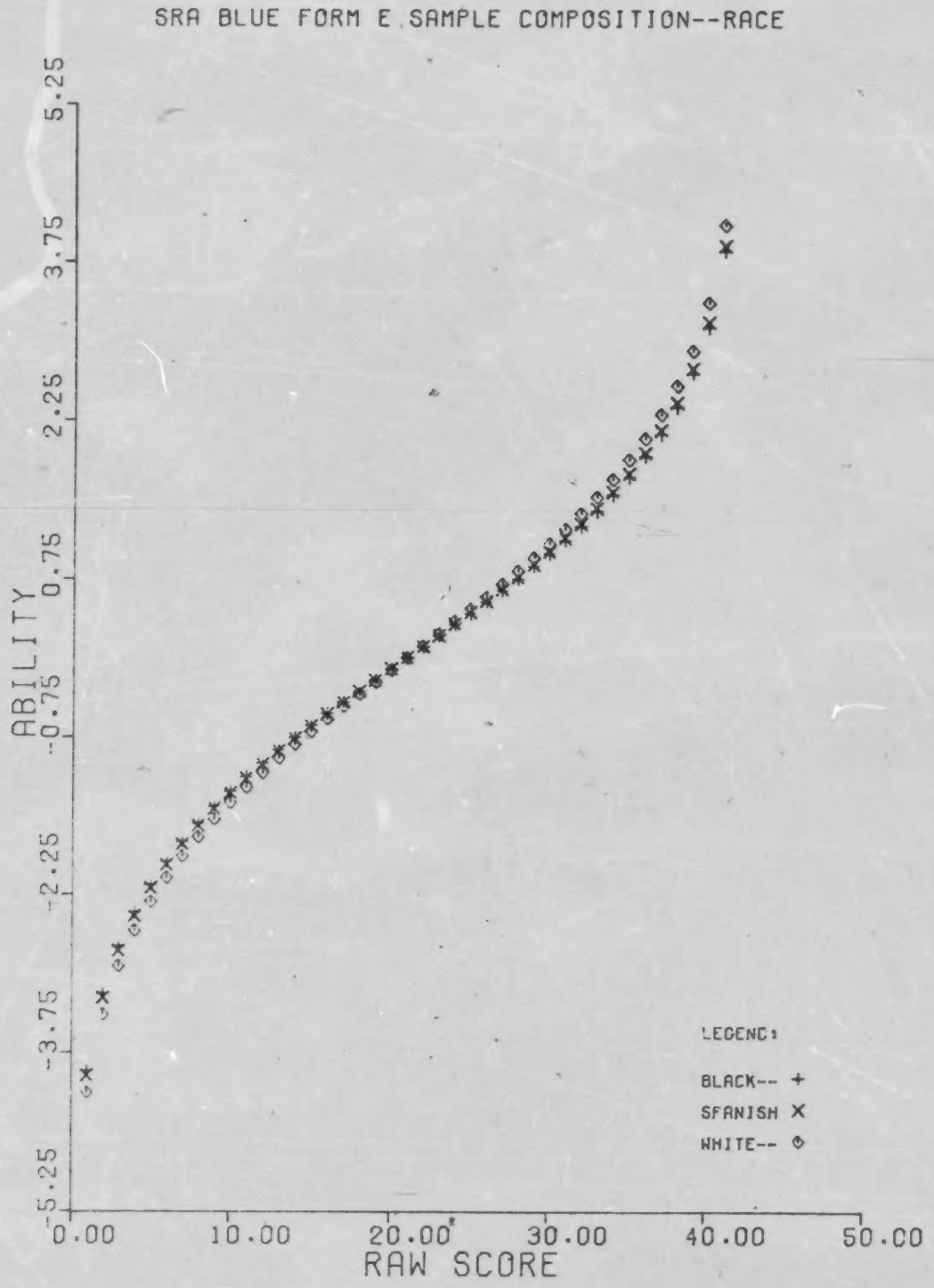

SRA BLUE FORM E SAMPLE COMPOSITION--RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.17

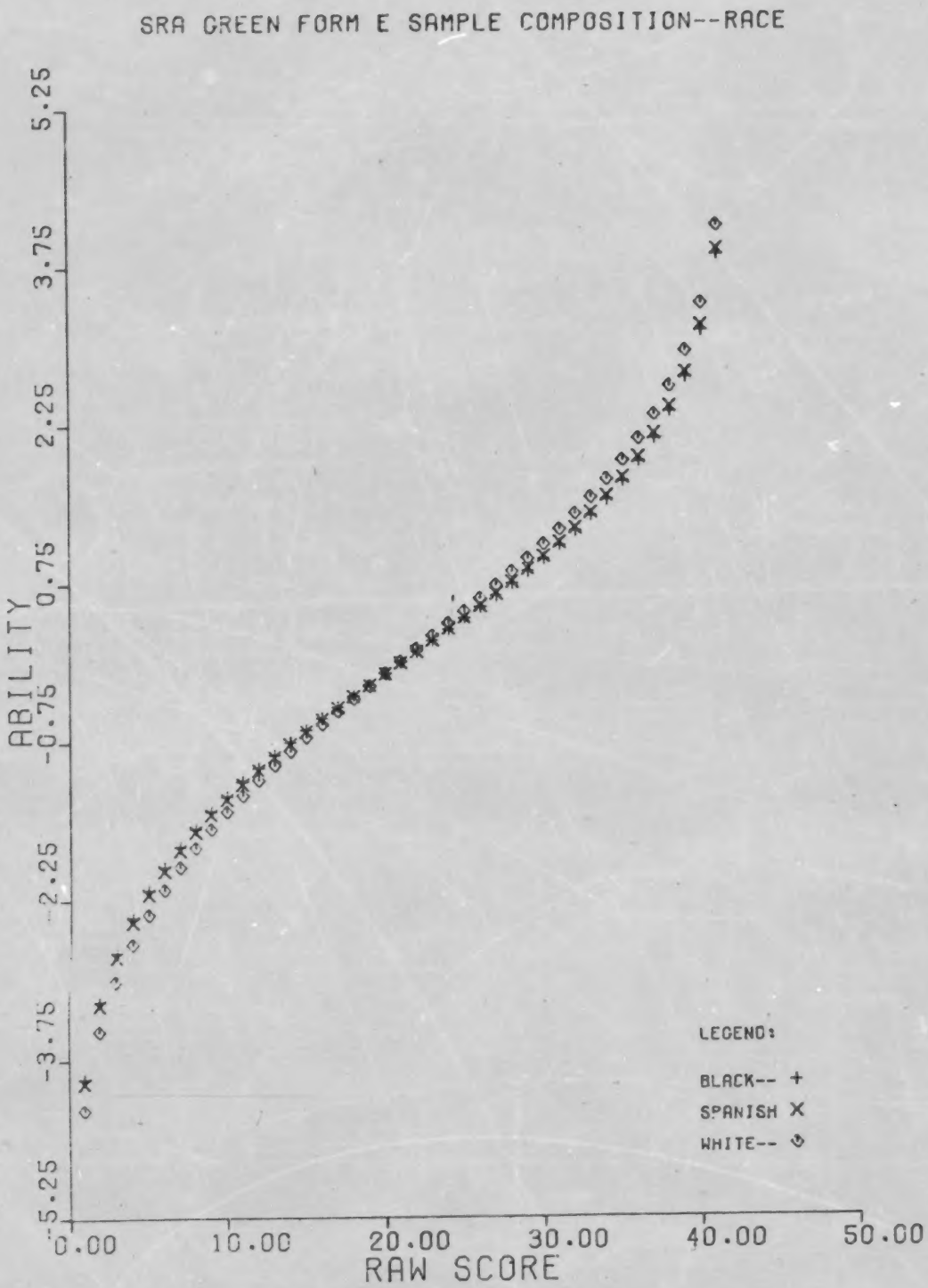

SRA GREEN FORM E SAMPLE COMPOSITION--RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.18

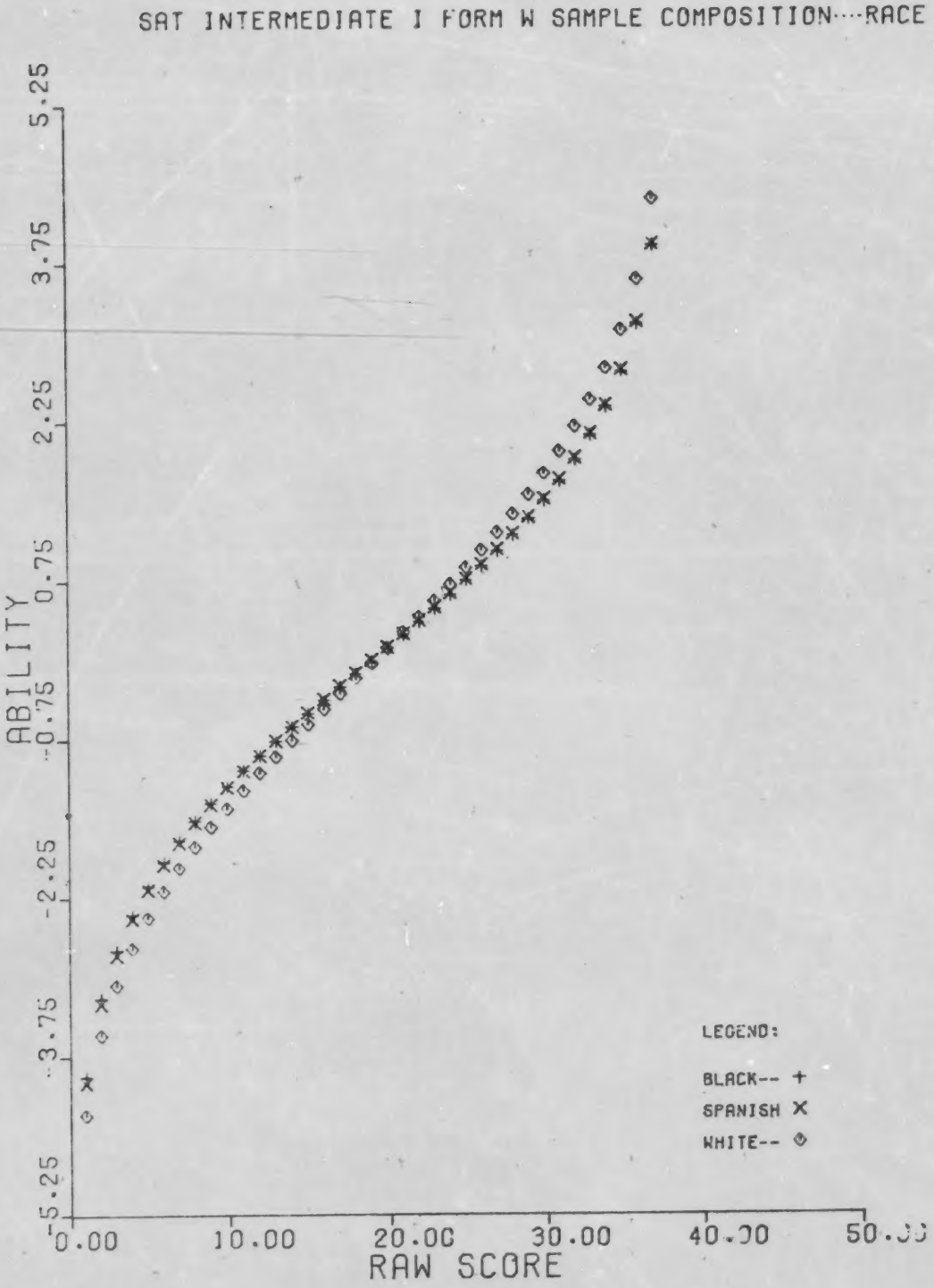

SAT INTERMEDIATE I FORM W SAMPLE COMPOSITION····RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.19

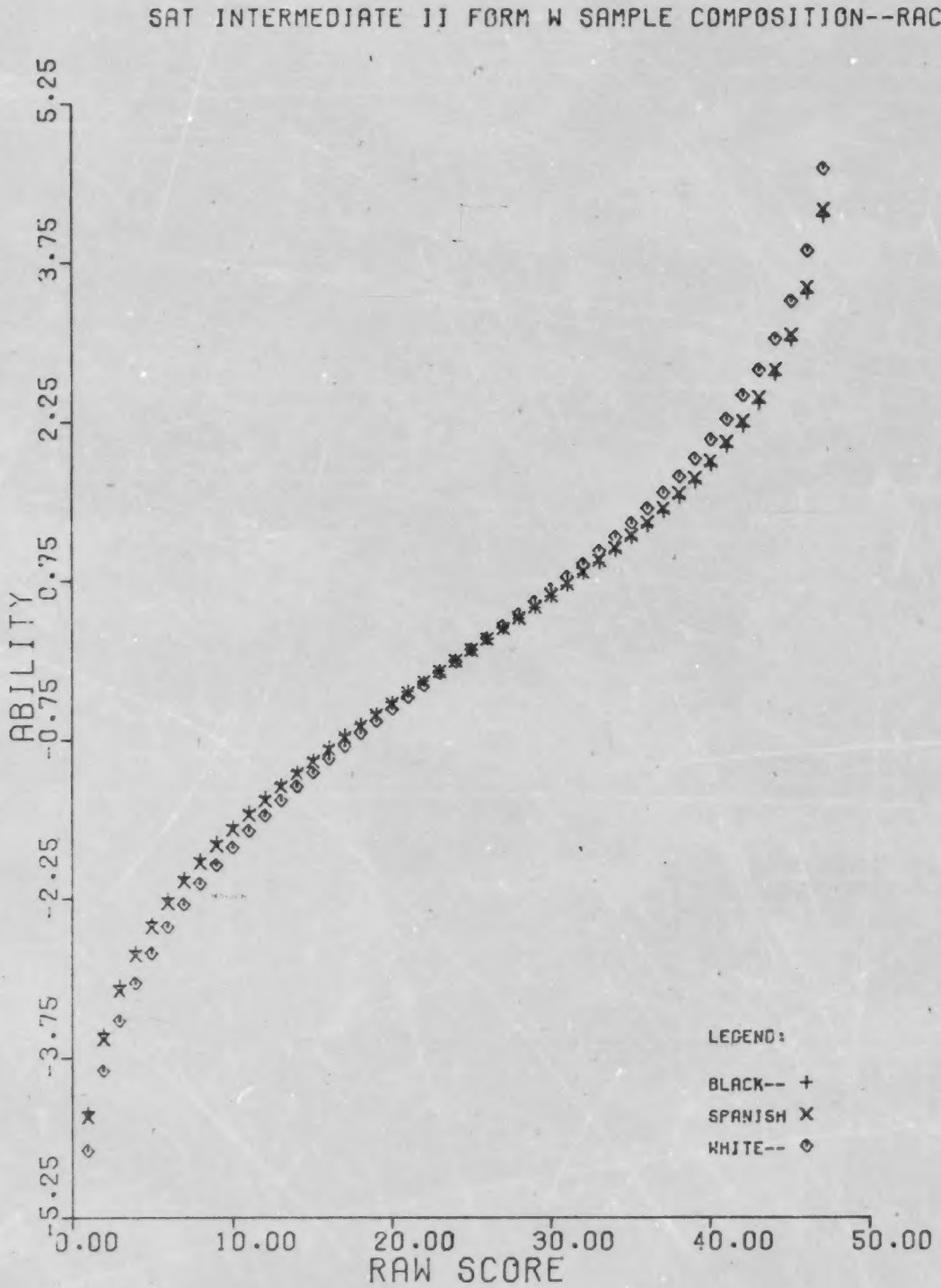

SAT INTERMEDIATE II FORM W SAMPLE COMPOSITION--RACE
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
BLACK-- +
SPANISH X
WHITE-- ◇

Figure 3.4.20

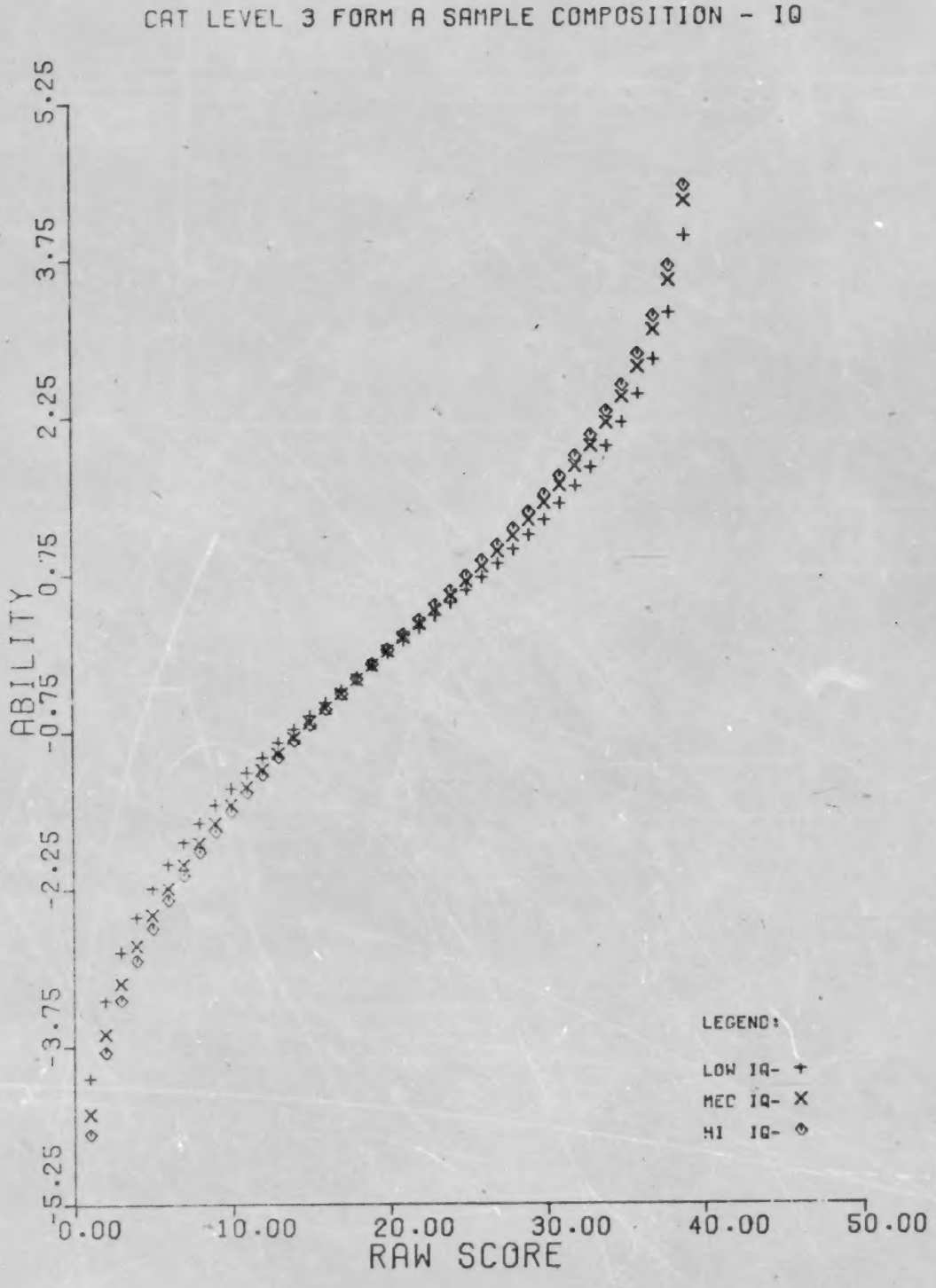

CAT LEVEL 3 FORM A SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.21

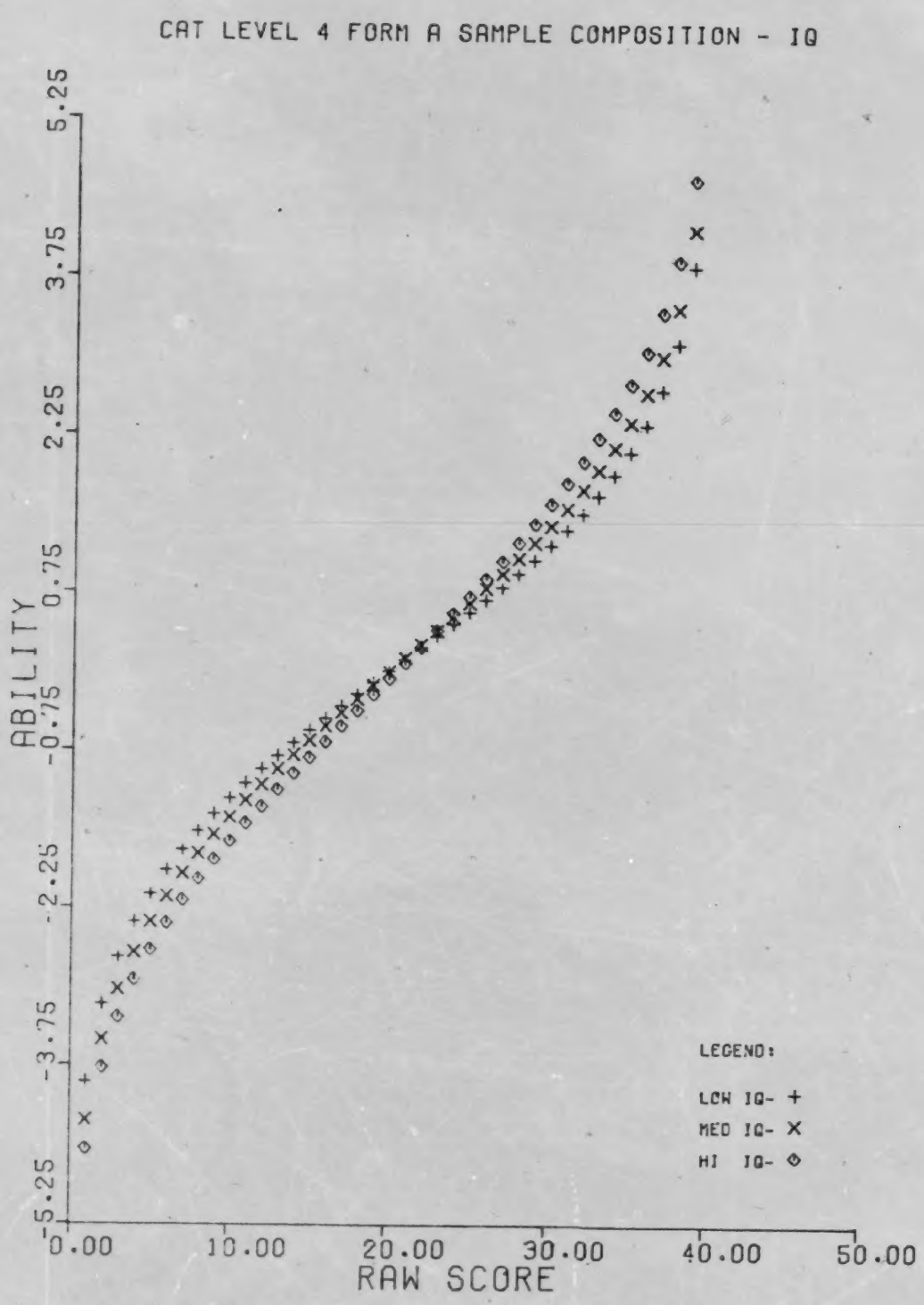

CAT LEVEL 4 FORM A SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.22

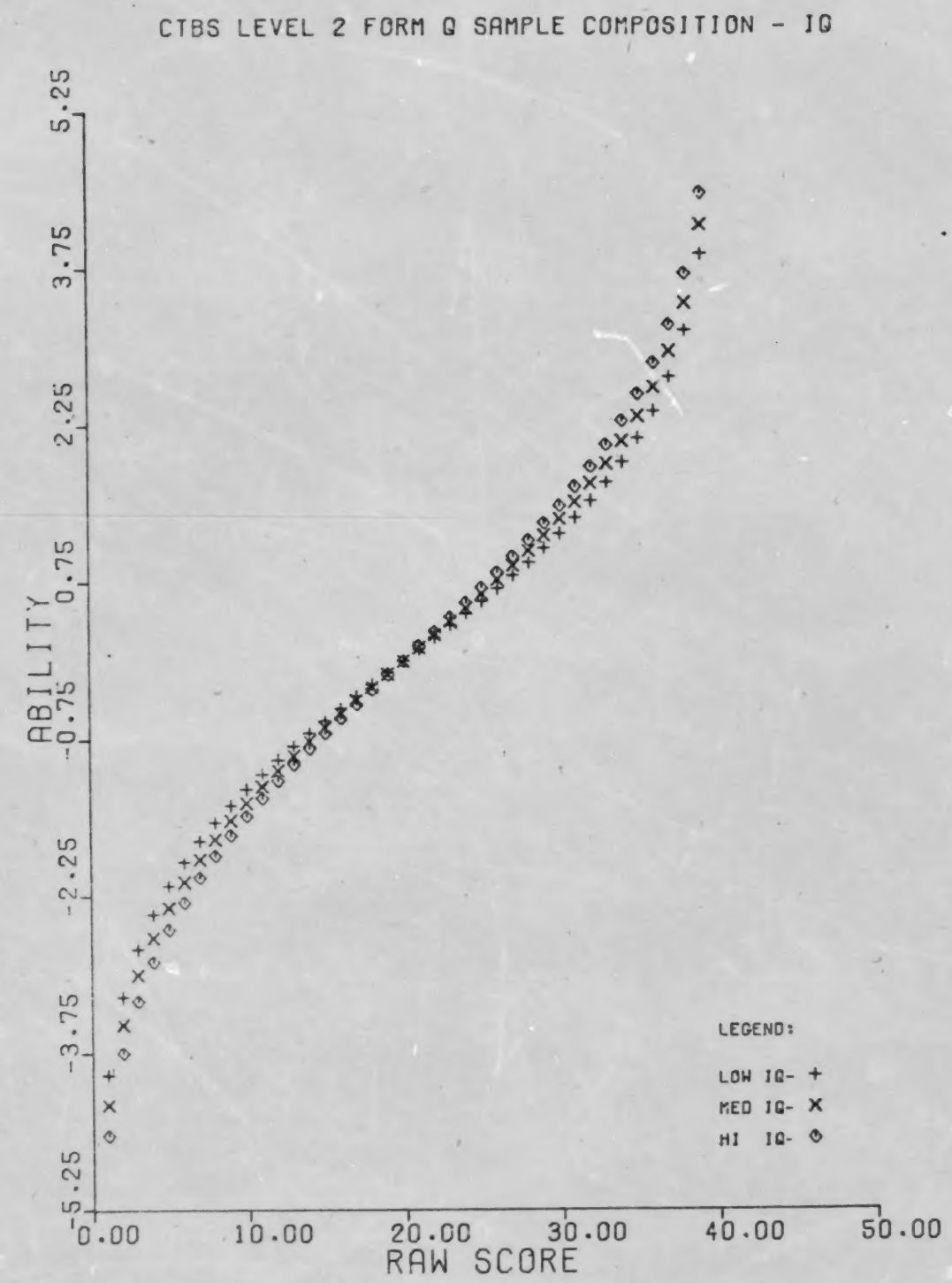

CTBS LEVEL 2 FORM Q SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.23

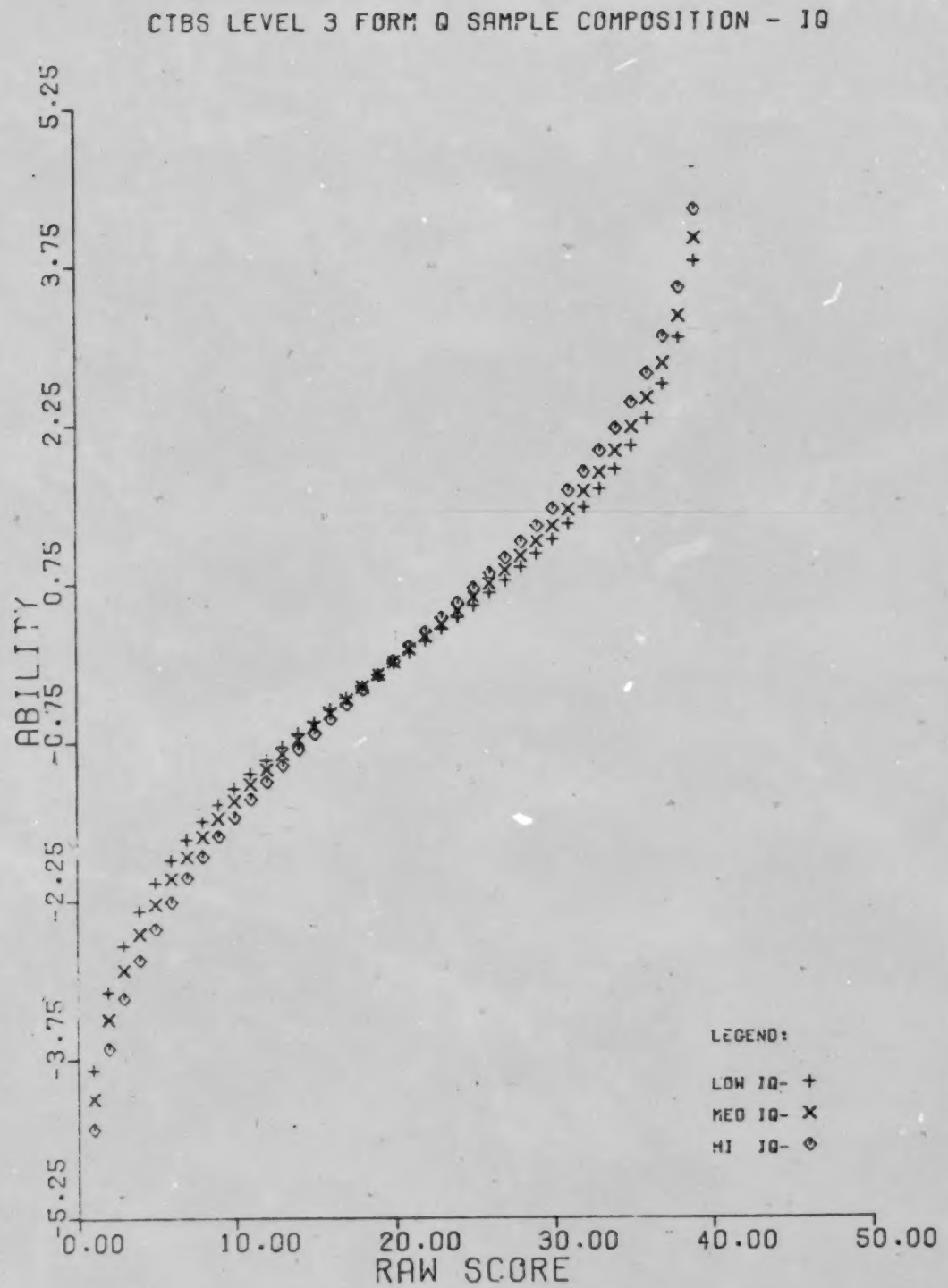

CTBS LEVEL 3 FORM Q SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.24

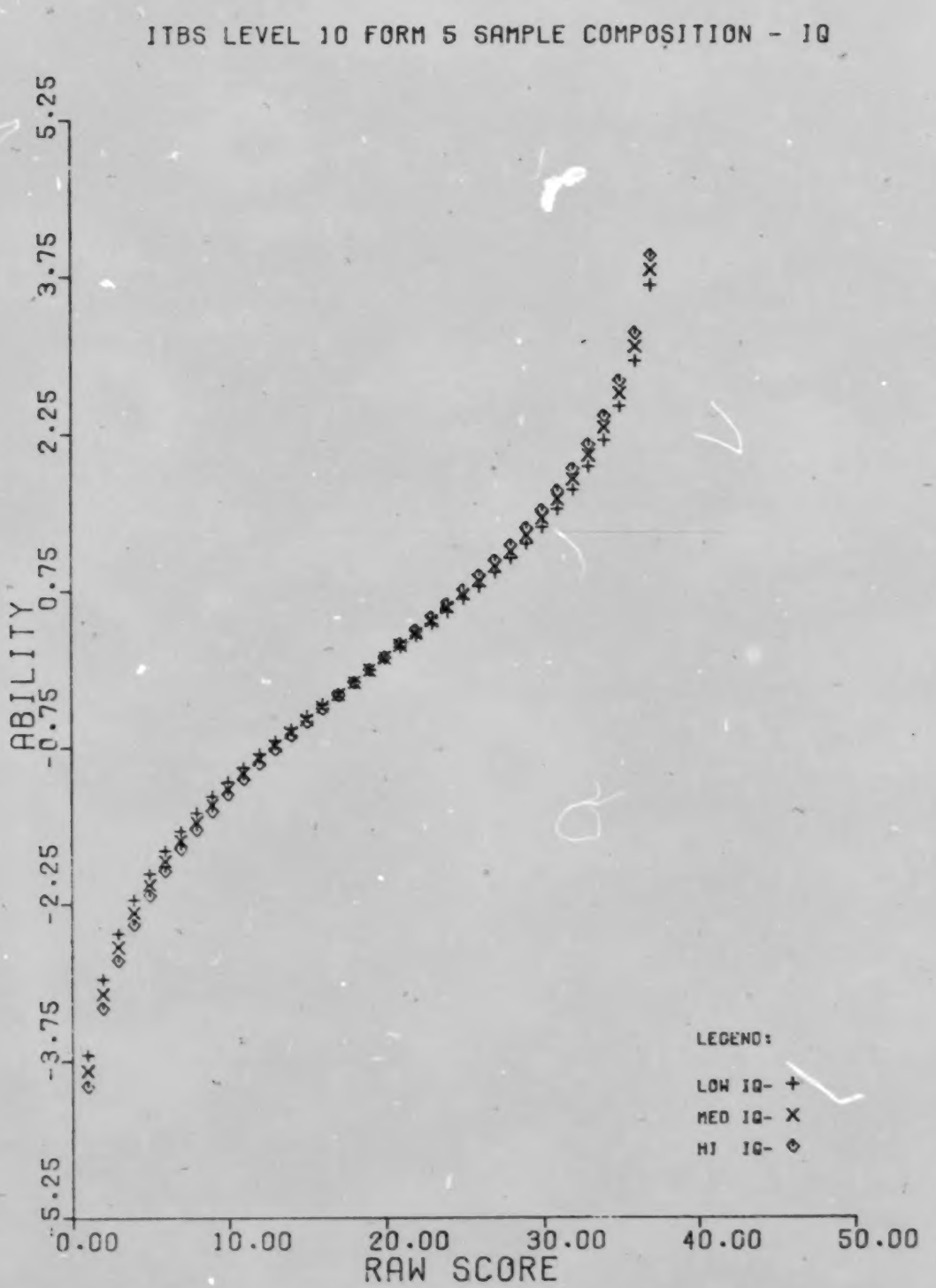

ITBS LEVEL 10 FORM 5 SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.25

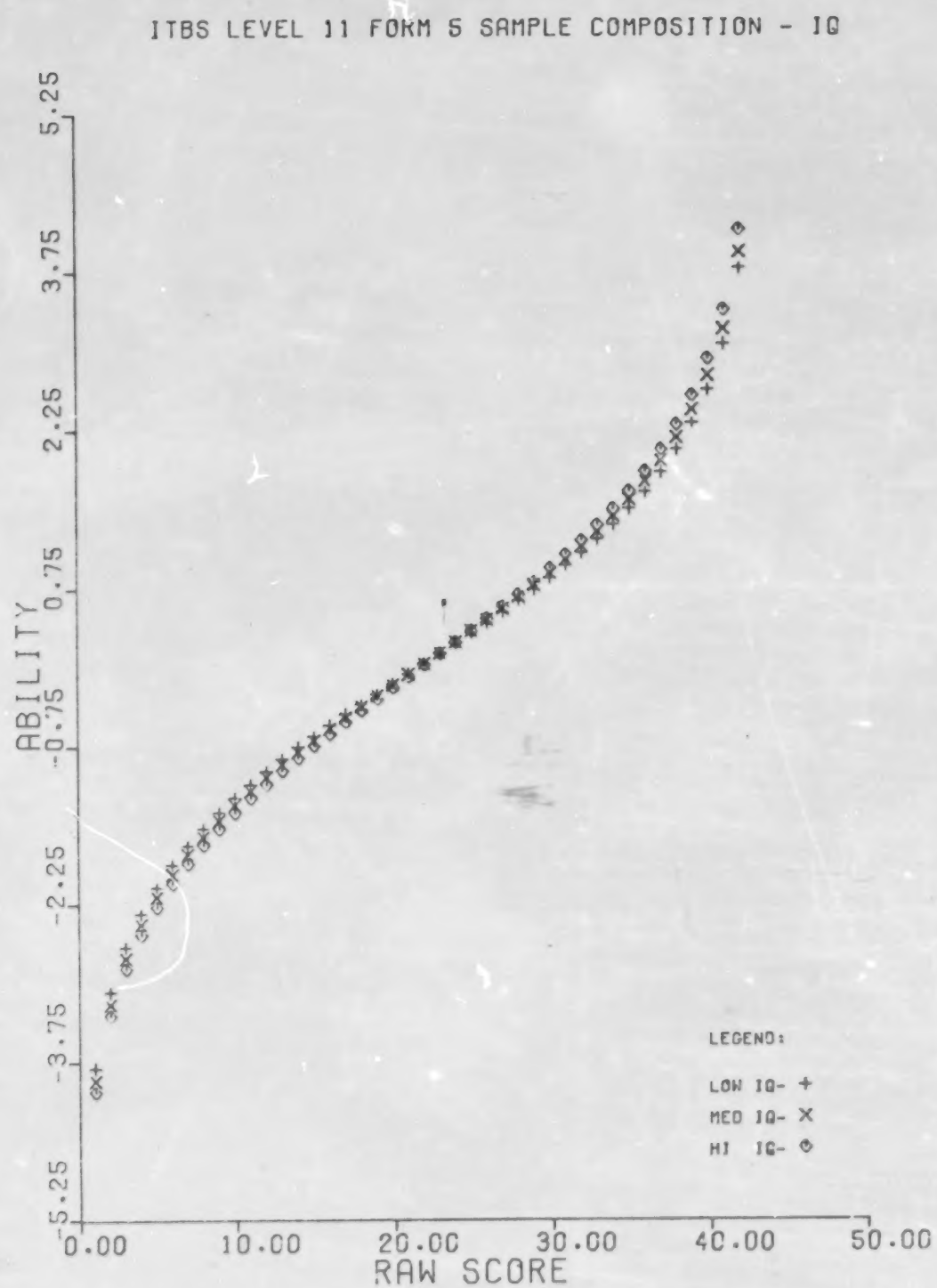

ITBS LEVEL 11 FORM S SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.26

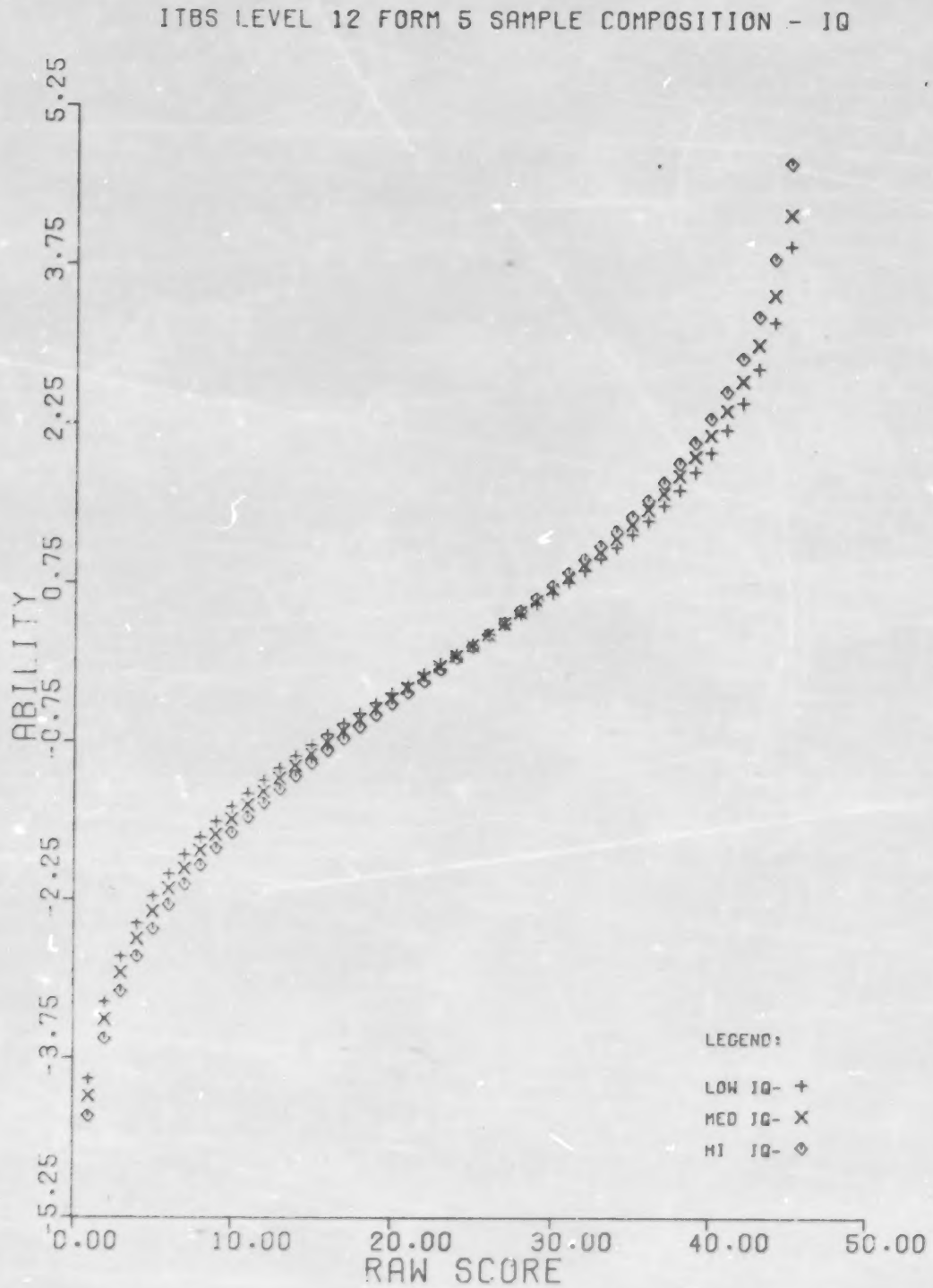

ITBS LEVEL 12 FORM 5 SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.27

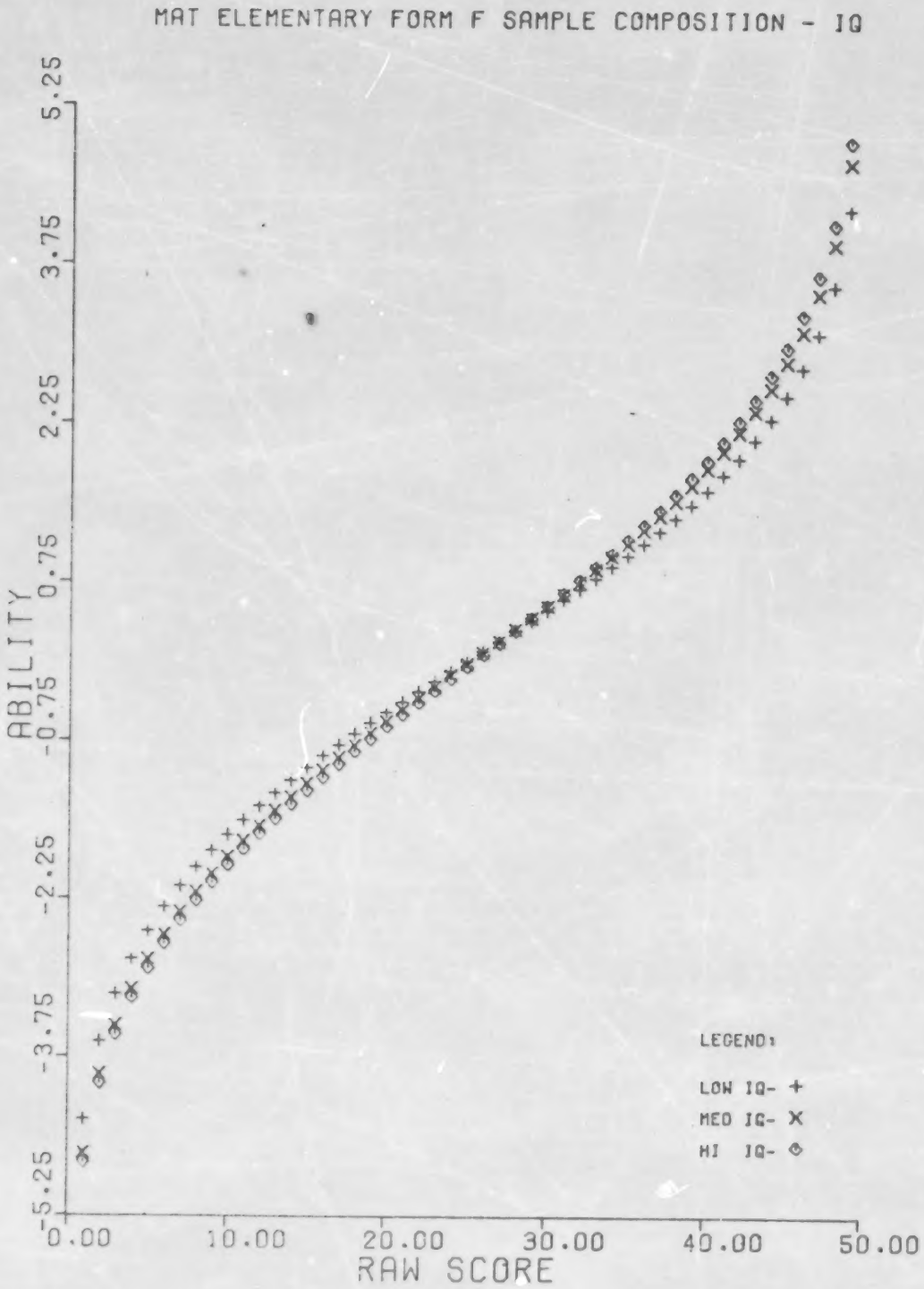

MAT ELEMENTARY FORM F SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.28

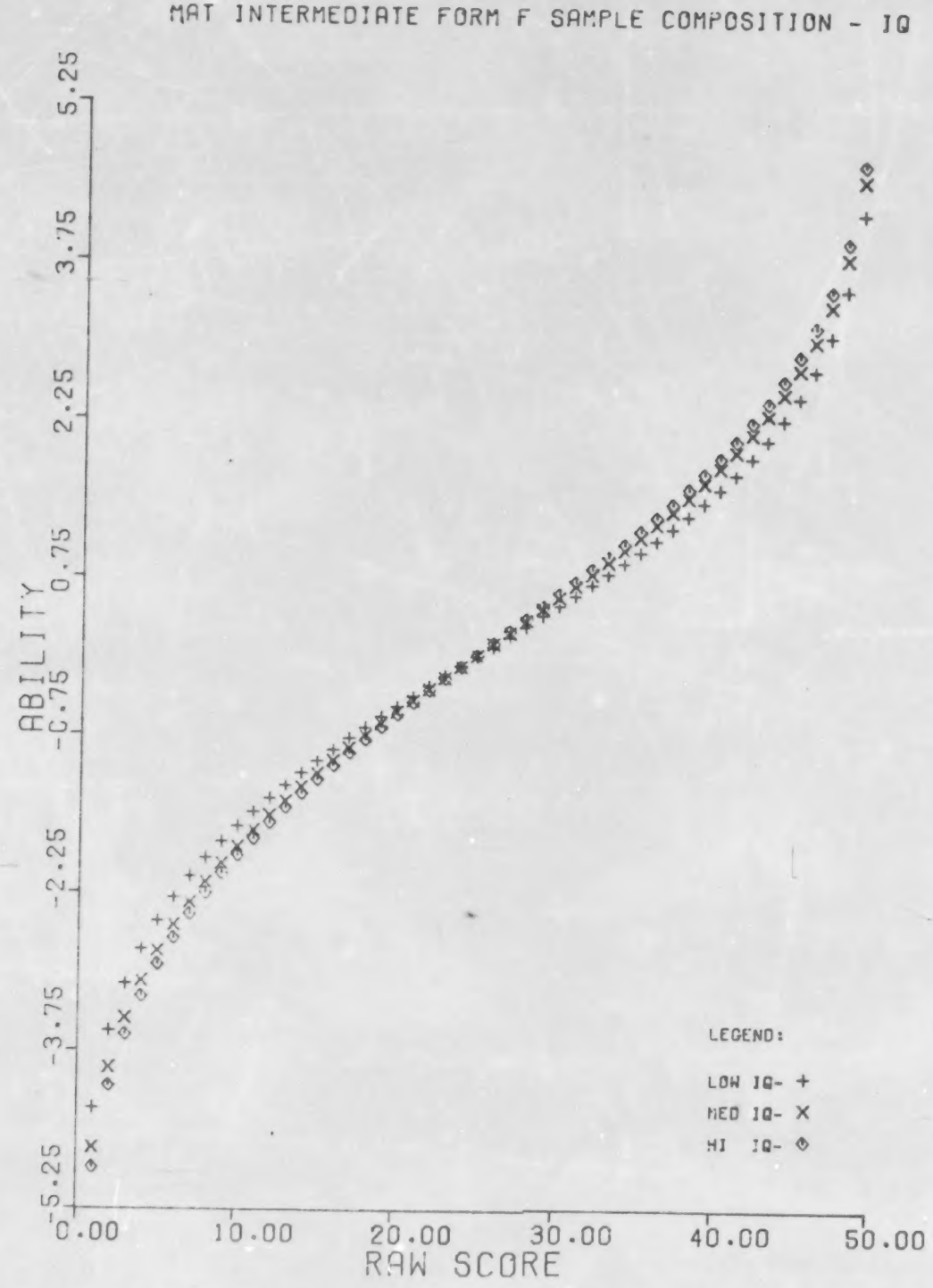

MAT INTERMEDIATE FORM F SAMPLE COMPOSITION - IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Figure 3.4.29

SRA BLUE FORM E SAMPLE COMPOSITION--IQ

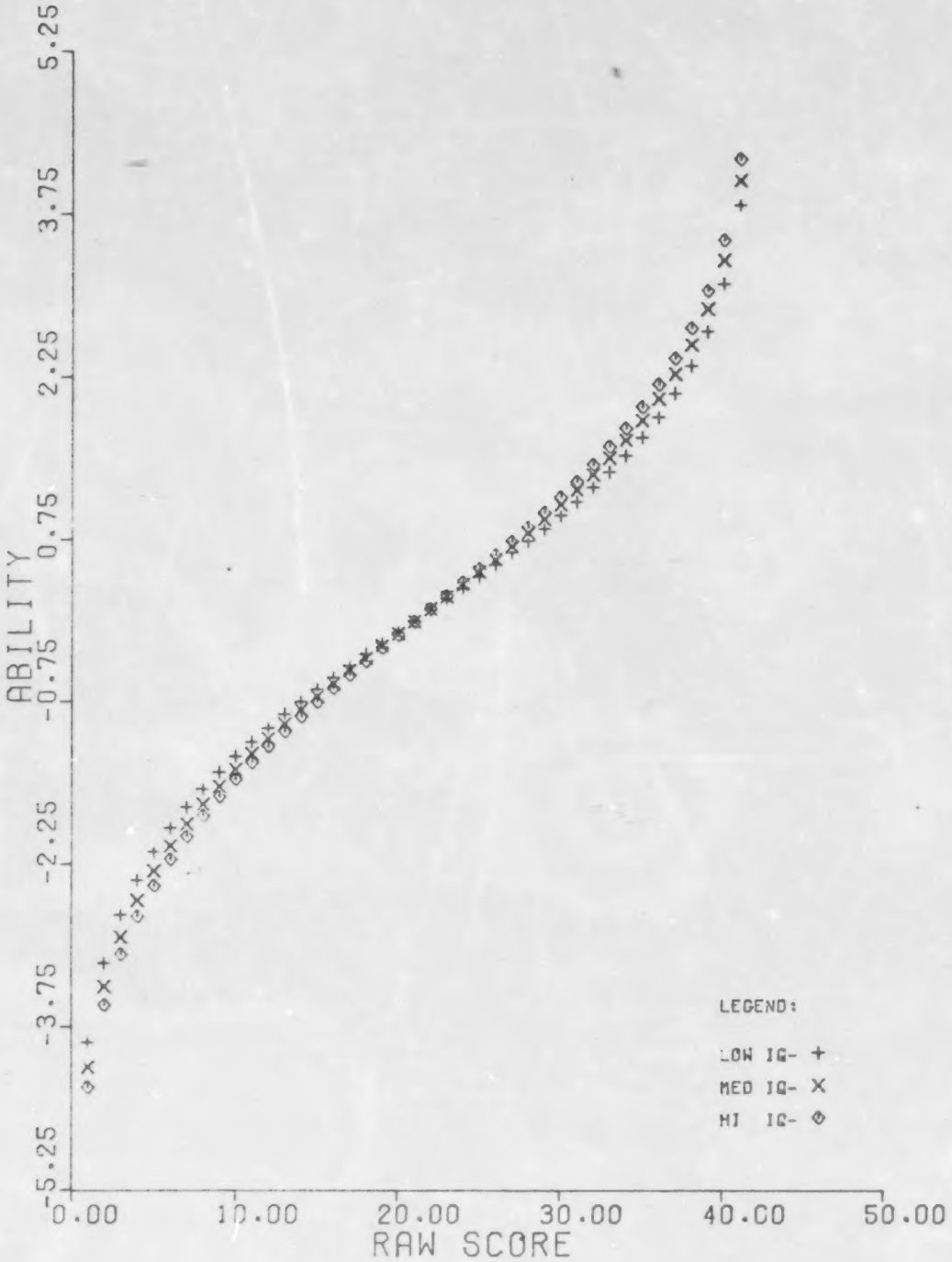


Figure 3.4.30

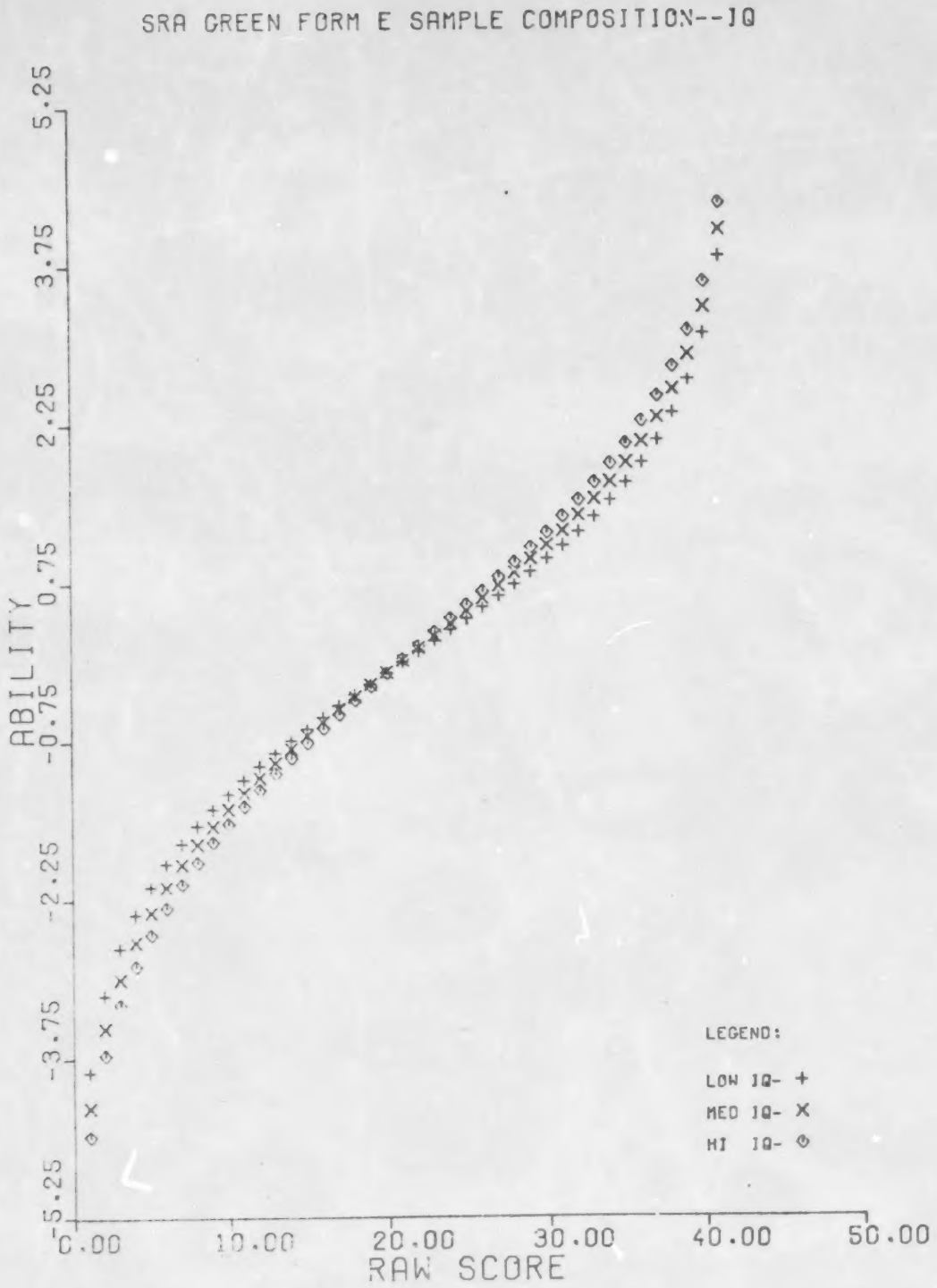

SRA GREEN FORM E SAMPLE COMPOSITION--IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ⊙

Figure 3.4.31

SAT INTERMEDIATE I FORM W SAMPLE COMPOSITION--IQ

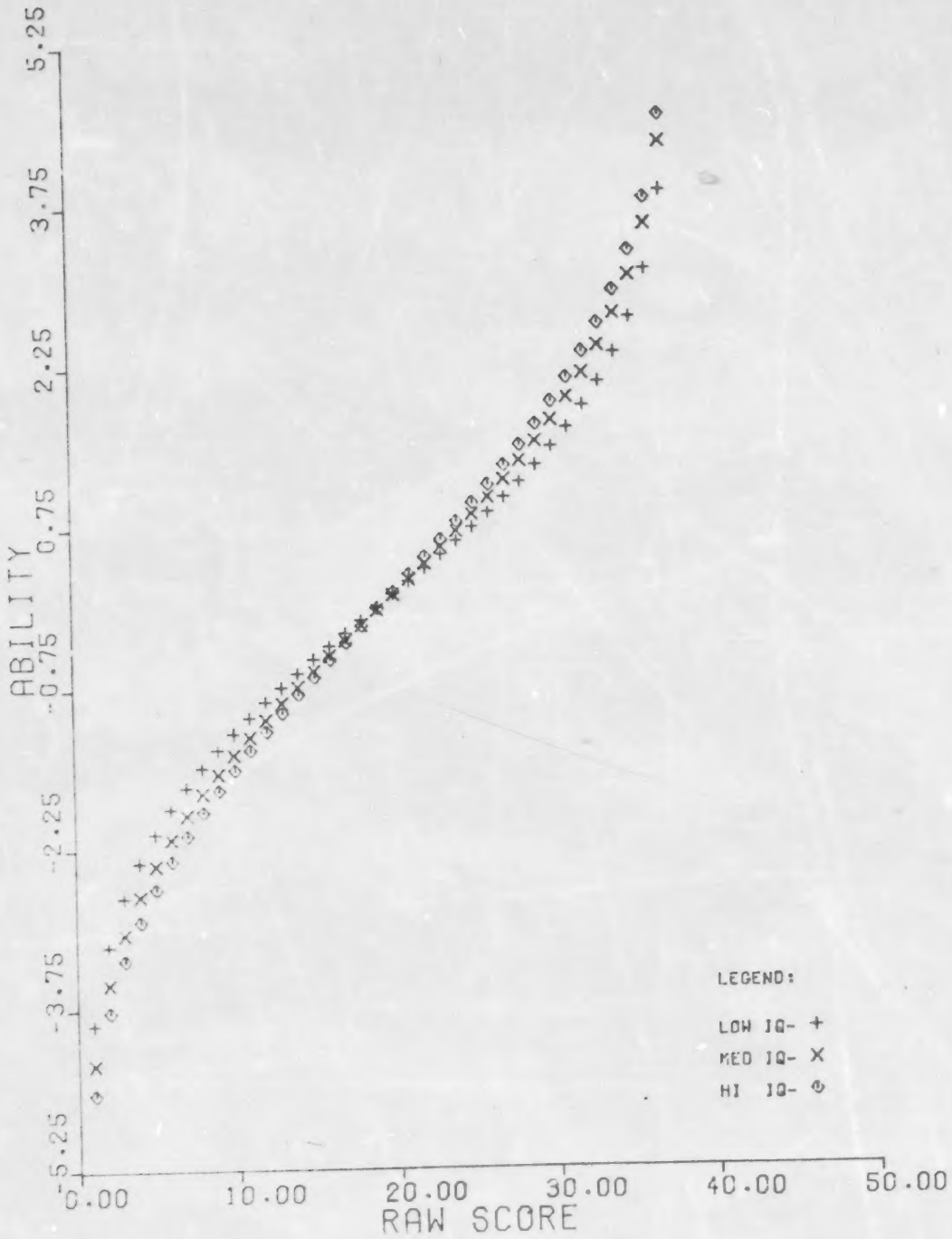
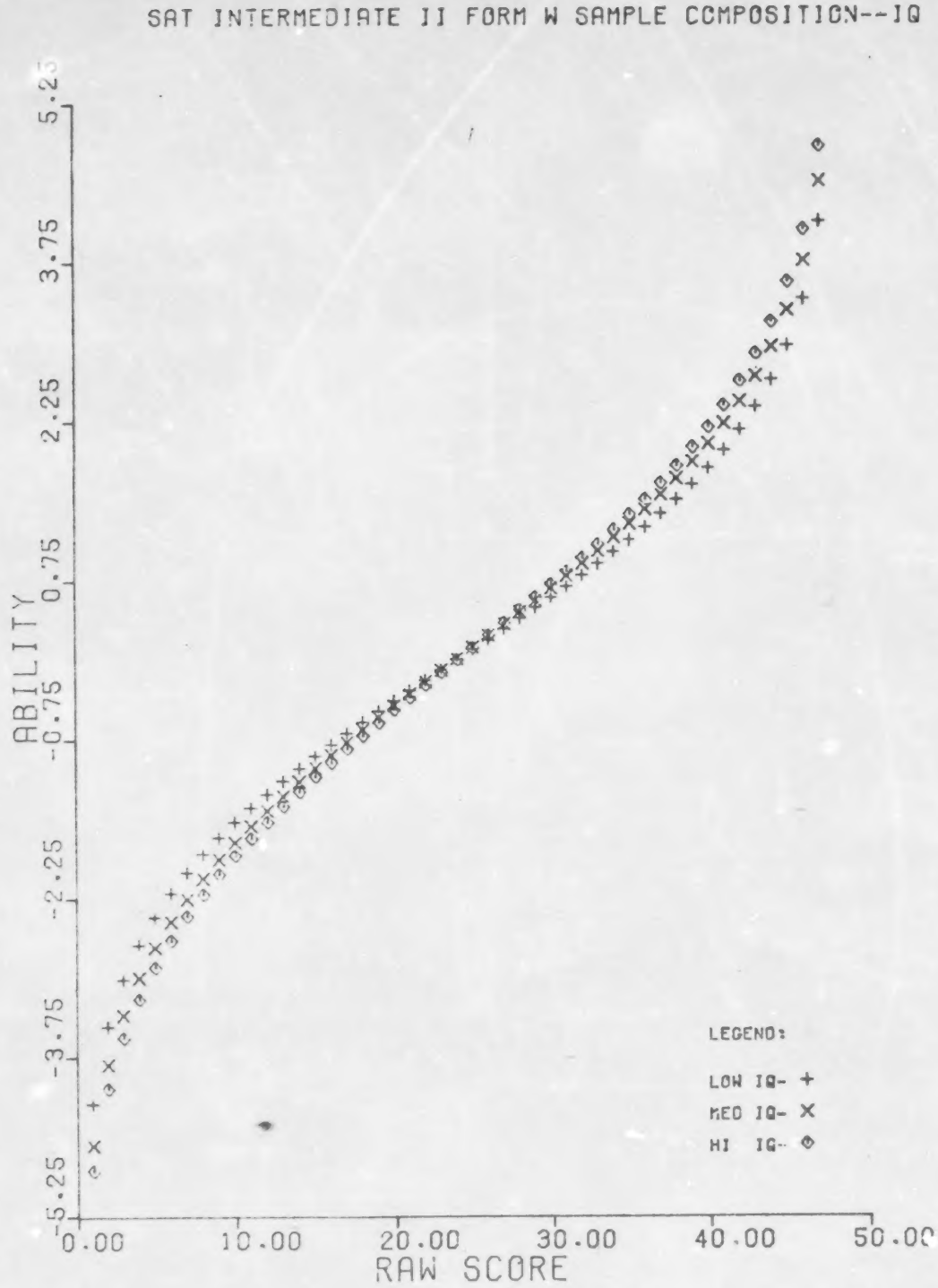


Figure 3.4.32


SAT INTERMEDIATE II FORM W SAMPLE COMPOSITION--IQ
ABILITY
5.25
3.75
2.25
0.75
-0.75
-2.25
-3.75
-5.25
0.00
10.00
20.00
30.00
40.00
50.00
RAW SCORE
LEGEND:
LOW IQ- +
MED IQ- X
HI IQ- ◇

Appendix C

Equating Tables - Vocabulary

TABLE 1

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 3 FORM A VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
CAT 3-A	CAT 3-B	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	3	1	1	1	1	1	1
2	2	1	2	1	1	1	1	6	2	2	2	1	2	1
3	2	1	3	1	2	1	1	8	3	3	3	1	2	1
4	3	1	4	1	3	2	1	11	4	4	4	2	3	2
5	4	2	6	2	4	3	2	13	5	5	5	2	4	2
6	5	2	7	2	4	3	2	15	6	6	6	3	5	3
7	6	3	8	2	5	4	3	17	7	7	7	4	5	3
8	6	3	9	3	6	5	3	19	8	8	8	4	6	4
9	7	4	10	3	7	5	4	20	9	8	9	5	7	5
10	8	4	11	4	8	6	4	22	10	9	10	6	8	5
11	9	5	12	4	9	7	5	23	11	10	11	6	9	6
12	10	5	13	5	10	8	6	25	12	11	12	7	10	7
13	10	6	15	5	11	9	6	26	13	12	13	8	11	7
14	11	7	16	6	12	10	7	28	15	12	14	9	12	8
15	12	7	17	7	13	11	8	29	16	13	15	10	13	9
16	13	8	18	7	14	12	9	30	17	14	17	11	14	10
17	14	9	19	8	16	13	10	32	18	15	18	12	14	11
18	15	10	20	9	17	14	11	33	19	15	19	12	15	12
19	16	10	21	10	18	15	12	34	21	16	20	13	16	12
20	16	11	22	11	19	17	13	35	22	17	21	15	17	13
21	17	12	23	11	20	18	14	36	23	17	23	16	18	14
22	18	13	24	12	21	19	15	37	24	18	24	17	19	16
23	19	14	25	13	22	20	16	38	26	19	25	18	20	17
24	20	15	26	14	23	22	17	39	27	19	26	19	21	18
25	21	16	27	15	24	23	19	40	28	20	27	20	22	19
26	22	17	28	16	25	24	20	41	29	21	28	21	23	20
27	23	18	29	18	26	26	21	41	31	21	29	23	24	21
28	24	19	30	19	28	27	23	42	32	22	30	24	25	23
29	25	20	31	20	29	28	24	43	33	22	32	25	26	24
30	26	21	32	21	30	30	26	44	35	23	33	27	27	26
31	28	23	33	23	31	31	27	44	36	24	34	28	28	27
32	29	24	34	24	31	33	29	45	37	24	35	29	29	29
33	30	25	34	26	32	34	31	46	39	25	36	31	30	31
34	31	27	35	27	33	35	33	47	40	26	37	32	31	32
35	32	29	36	29	34	37	35	47	42	26	38	34	32	34
36	34	30	37	31	35	38	37	48	43	27	39	35	33	36
37	35	32	38	33	36	39	39	48	45	28	39	37	34	39
38	37	34	38	35	37	40	41	49	47	28	40	39	35	41
39	38	37	39	37	37	42	43	49	48	29	41	40	37	44

TABLE 2

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 4 FORM A VOCABULARY

RAW SCORE CAT 4-A	EQUIVALENT SCORES CAT 3-A	CAT 4-B	CTBS 2-Q	CTBS 3-Q	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	3	1	4	1	2	2	1	9	3	3	3	1	2	1
2	6	2	6	2	4	3	2	14	5	6	5	3	4	3
3	8	3	9	3	6	4	3	18	8	7	7	4	6	4
4	10	4	11	4	8	6	4	21	10	9	9	5	8	5
5	11	5	13	5	10	8	5	24	12	10	11	7	9	6
6	13	5	15	5	11	9	6	26	14	12	13	8	11	7
7	15	6	16	6	13	11	8	28	15	13	15	9	12	9
8	16	7	18	7	14	12	9	30	17	14	17	11	13	10
9	17	8	19	8	16	14	10	32	18	15	18	12	15	11
10	19	9	21	9	17	15	11	33	20	16	20	13	16	12
11	20	10	22	10	19	16	12	35	21	16	21	14	17	13
12	21	10	23	11	20	18	14	36	23	17	22	15	18	14
13	22	11	24	12	21	19	15	37	24	18	24	17	19	16
14	23	12	25	13	22	21	16	38	26	19	25	18	20	17
15	24	13	26	14	23	22	18	39	27	19	26	19	21	18
16	25	14	27	15	24	23	19	40	28	20	27	20	22	19
17	26	15	28	16	26	25	20	41	29	21	28	21	23	20
18	27	16	29	18	26	26	21	41	31	21	29	23	24	22
19	28	16	30	19	27	27	23	42	32	22	30	24	25	23
20	29	17	31	20	28	28	24	43	33	22	31	25	26	24
21	30	18	32	21	29	29	25	43	34	23	32	26	26	25
22	30	19	32	22	30	30	27	44	35	23	33	27	27	26
23	31	20	33	23	31	31	28	45	36	24	34	28	28	28
24	32	21	34	24	31	32	29	45	37	24	35	29	29	29
25	33	22	34	25	32	33	30	46	38	25	35	30	30	30
26	33	23	35	26	33	34	32	46	39	25	36	31	30	31
27	34	24	35	27	33	35	33	47	40	26	37	32	31	32
28	35	25	36	28	34	36	34	47	41	26	37	33	32	34
29	35	26	36	30	34	37	35	47	42	27	38	34	32	35
30	36	27	37	31	35	38	36	48	43	27	38	35	33	36
31	36	28	37	32	35	38	37	48	44	27	39	36	34	37
32	37	29	38	33	36	39	38	48	45	28	39	37	34	38
33	37	30	38	34	36	40	39	48	46	28	40	38	35	40
34	38	31	38	35	36	40	40	49	46	28	40	38	35	41
35	38	32	39	36	37	41	41	49	47	29	40	39	36	42
36	39	34	39	37	37	41	42	49	48	29	41	40	36	43
37	39	35	39	37	37	42	43	49	48	29	41	40	37	44
38	39	37	39	38	37	42	44	49	49	29	41	41	37	45
39	39	38	39	39	37	42	45	49	49	29	41	41	37	47

TABLE 3

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 2 FORM C VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
CTBS 2-C	CAT 3-A	CAT 4-A	CTBS 2-R	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	[illegible]	1	1	1	1	1	1
[illegible]	2	1	1	1	1	1	1	[illegible]	2	2	2	1	1	1
[illegible]	3	1	2	1	[illegible]	1	1	[illegible]	[illegible]	3	2	1	2	1
[illegible]	4	1	3	1	[illegible]	[illegible]	1	10	[illegible]	4	3	2	3	2
[illegible]	5	2	4	1	3	[illegible]	[illegible]	12	4	5	4	2	3	2
[illegible]	5	2	4	[illegible]	4	[illegible]	[illegible]	14	5	5	5	3	4	2
[illegible]	6	[illegible]	5	[illegible]	5	[illegible]	[illegible]	15	6	6	6	3	5	3
[illegible]	7	3	6	[illegible]	5	4	3	17	7	7	7	4	6	3
[illegible]	8	3	7	3	6	5	3	19	8	8	8	4	6	4
10	9	4	7	3	7	5	4	20	9	8	9	5	7	4
11	10	4	8	4	8	6	4	22	10	9	10	5	8	5
12	11	5	9	4	9	7	5	23	11	10	11	6	9	6
13	12	5	10	[illegible]	10	8	5	24	12	11	12	7	10	6
14	13	6	11	[illegible]	11	8	6	26	13	11	13	8	10	7
15	13	6	12	6	12	[illegible]	7	27	14	12	14	8	11	8
16	14	7	12	6	13	10	7	28	15	13	15	9	12	8
17	15	7	13	7	14	11	8	29	16	13	16	10	13	9
18	16	8	14	7	15	12	9	30	17	14	17	11	14	10
19	17	9	15	8	16	13	10	32	18	15	18	12	14	11
20	18	10	16	9	17	14	11	33	19	15	19	12	15	12
21	19	10	17	10	18	15	12	34	20	16	20	13	16	12
22	20	11	18	10	19	17	13	35	22	17	21	14	17	13
23	21	12	19	11	20	18	14	36	23	17	22	15	18	14
24	22	13	20	12	21	19	15	37	24	18	23	16	19	15
25	23	14	21	13	22	20	16	38	25	18	25	18	20	16
26	24	15	22	14	23	21	17	39	26	19	26	19	21	18
27	25	16	23	15	24	23	18	40	28	20	27	20	22	19
28	26	17	24	16	25	24	20	40	29	20	28	21	23	20
29	27	18	25	17	26	26	21	41	30	21	29	22	24	21
30	28	19	26	19	27	27	23	42	32	22	30	24	25	23
31	29	20	27	20	29	29	24	43	33	22	32	25	26	24
32	30	22	28	21	30	30	26	44	35	23	33	27	27	26
33	31	23	29	23	31	32	28	45	36	24	34	28	28	28
34	32	25	31	25	32	33	30	45	38	25	35	30	29	30
35	34	26	32	27	33	35	32	46	40	25	36	32	30	32
36	35	28	33	29	34	36	34	47	42	26	37	34	32	34
37	36	30	35	31	35	38	37	48	43	27	39	35	33	36
38	37	33	36	34	36	40	39	48	45	28	40	38	35	39
39	39	36	38	37	37	41	42	49	48	29	41	40	36	43

TABLE 4

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 3 FORM C VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
CTBS 3-C	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-R	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	4	1	4	1	2	2	1	10	3	4	3	2	3	2
2	6	2	7	2	5	3	2	15	6	6	6	3	5	3
3	9	3	10	3	7	5	3	19	8	8	8	5	7	4
4	11	4	12	4	9	7	5	23	11	10	10	6	9	6
5	12	6	14	5	10	8	6	25	13	11	12	7	10	7
6	14	7	16	5	12	10	7	28	15	12	14	9	12	8
7	15	8	17	6	14	11	8	30	16	13	16	10	13	9
8	17	9	19	7	15	13	10	31	18	14	18	11	14	10
9	18	10	20	8	17	14	11	33	20	15	19	13	16	12
10	19	11	22	9	18	16	12	34	21	16	21	14	17	13
11	21	12	23	10	19	17	13	35	22	17	22	15	18	14
12	22	13	24	11	21	19	15	37	24	18	23	16	19	15
13	23	14	25	12	22	20	16	38	25	18	25	18	20	16
14	24	15	26	13	23	21	17	39	26	19	26	19	21	17
15	25	16	27	14	24	23	18	39	28	20	27	20	22	19
16	26	17	28	15	25	24	20	40	29	20	28	21	23	20
17	27	17	29	15	26	25	21	41	30	21	29	22	23	21
18	27	18	29	16	27	26	22	42	31	21	30	23	24	22
19	28	19	30	17	28	27	23	42	32	22	31	24	25	23
20	29	20	31	18	29	28	24	43	33	22	32	25	26	24
21	30	21	32	19	29	30	26	44	34	23	32	26	27	25
22	31	22	32	20	30	31	27	44	35	23	33	27	27	26
23	31	23	33	21	31	31	28	45	36	24	34	28	28	28
24	32	24	34	22	31	32	29	45	37	24	35	29	29	29
25	33	25	34	23	32	33	30	46	38	25	35	30	29	30
26	33	26	35	24	33	34	31	46	39	25	36	31	30	31
27	34	27	35	25	33	35	32	46	40	26	36	32	31	32
28	34	28	36	26	34	36	33	47	41	26	37	33	31	33
29	35	29	36	27	34	36	34	47	42	26	38	34	32	34
30	35	29	37	28	35	37	36	47	43	27	38	35	33	35
31	36	30	37	29	35	38	37	48	43	27	39	35	33	36
32	36	31	37	31	35	39	38	48	44	27	39	36	34	38
33	37	32	38	32	36	39	39	48	45	28	39	37	34	39
34	37	33	38	33	36	40	40	49	46	28	40	38	35	40
35	38	34	38	34	36	40	41	49	47	28	40	39	35	41
36	38	35	39	35	37	41	42	49	47	29	41	39	36	42
37	39	36	39	36	37	41	43	49	48	29	41	40	36	44
38	39	38	39	37	37	42	44	49	49	29	41	41	37	45
39	39	39	39	39	37	42	45	49	49	29	41	41	37	46

TABLE 5

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 10 FORM 5 VOCABULARY

RAW SCORE ITBS 10-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-6	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	2	1	2	1	1	1	1	5	2	2	1	1	1	1
2	3	1	3	1	2	1	1	8	3	3	3	1	2	1
3	4	2	5	1	3	2	1	11	4	4	4	2	3	2
4	6	2	6	2	3	3	2	14	5	6	5	3	4	3
5	7	3	8	2	4	4	3	16	7	7	6	3	5	3
6	8	3	9	3	5	4	3	18	8	8	7	4	6	4
7	9	4	10	3	6	5	4	20	9	8	9	5	7	4
8	10	4	11	4	7	6	4	22	10	9	10	6	8	5
9	11	5	12	4	8	7	5	23	11	10	11	6	9	6
10	12	5	13	5	9	8	6	25	12	11	12	7	10	6
11	13	6	14	5	10	9	6	26	13	12	13	8	11	7
12	14	6	15	6	11	10	7	27	14	12	14	9	11	8
13	15	7	16	7	12	11	8	29	15	13	15	9	12	9
14	16	8	17	7	13	12	8	30	17	14	16	10	13	9
15	17	8	18	8	14	13	9	31	18	14	17	11	14	10
16	17	9	19	8	15	14	10	32	19	15	18	12	15	11
17	18	10	20	9	17	15	11	33	20	16	19	13	16	12
18	19	11	21	10	18	16	12	34	21	16	20	14	17	13
19	20	11	22	11	19	17	13	35	22	17	22	15	17	14
20	21	12	23	11	20	18	14	36	23	17	23	16	18	15
21	22	13	24	12	21	19	15	37	24	18	24	17	19	15
22	23	14	25	13	22	20	16	38	25	19	25	18	20	16
23	24	15	26	14	23	21	17	39	26	19	26	19	21	17
24	25	16	27	15	24	23	18	39	28	20	27	20	22	19
25	26	16	28	16	25	24	19	40	29	20	28	21	23	20
26	27	17	29	17	26	25	21	41	30	21	29	22	23	21
27	27	19	30	18	27	26	22	42	31	22	30	23	24	22
28	28	20	30	19	28	28	24	43	33	22	31	25	25	23
29	29	21	31	21	29	29	25	43	34	23	32	26	26	25
30	30	22	32	22	30	30	27	44	35	23	33	27	27	26
31	31	23	33	23	31	32	28	45	37	24	34	29	28	28
32	33	25	34	25	32	33	30	46	38	25	35	30	29	30
33	34	26	35	27	33	35	32	46	40	26	36	32	31	32
34	35	28	36	29	34	36	34	47	42	26	37	34	32	34
35	36	30	37	31	35	38	36	48	43	27	39	35	33	36
36	37	33	38	33	36	39	39	48	45	28	40	37	35	39
37	38	36	39	36	37	41	42	49	48	29	41	40	36	43

TABLE 6

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
ITBS 11-5	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-6	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	2	1	3	1	2	1	1	7	2	2	2	1	2	1
2	4	1	5	1	3	2	1	11	4	4	4	2	3	2
3	6	2	6	2	4	2	2	14	6	6	5	3	4	3
4	7	3	8	2	5	3	3	17	7	7	7	4	6	3
5	9	3	10	3	7	4	3	19	8	8	8	5	7	4
6	10	4	11	4	8	5	4	21	10	9	10	5	8	5
7	11	5	12	4	9	6	5	23	11	10	11	6	9	6
8	12	5	13	5	10	7	6	25	12	11	12	7	10	7
9	13	6	15	5	11	7	6	26	14	12	13	8	11	7
10	14	7	16	6	12	8	7	28	15	12	14	9	12	8
11	15	7	17	7	13	9	8	29	16	13	16	10	13	9
12	16	8	18	7	14	10	9	30	17	14	17	11	13	10
13	17	9	19	8	15	11	10	31	18	14	18	11	14	10
14	18	9	20	9	16	12	10	32	19	15	19	12	15	11
15	19	10	21	9	17	13	11	33	20	16	20	13	16	12
16	19	11	22	10	18	14	12	34	21	16	21	14	17	13
17	20	11	22	11	19	15	13	35	22	17	22	15	17	14
18	21	12	23	11	20	16	14	36	23	17	23	16	18	15
19	22	13	24	12	21	17	15	37	24	18	24	17	19	15
20	23	14	25	13	22	18	16	38	25	18	24	17	20	16
21	23	14	26	14	23	19	17	38	26	19	25	18	20	17
22	24	15	26	14	23	20	18	39	27	19	26	19	21	18
23	25	16	27	15	24	21	19	40	28	20	27	20	22	19
24	26	17	28	16	25	22	20	40	29	20	28	21	23	20
25	26	17	29	17	26	23	21	41	30	21	29	22	23	21
26	27	18	29	18	27	24	22	42	31	21	30	23	24	22
27	28	19	30	19	27	25	23	42	32	22	30	24	25	23
28	29	20	31	20	28	26	24	43	33	22	31	25	25	24
29	29	21	31	20	29	27	25	43	34	23	32	26	26	25
30	30	22	32	21	30	28	26	44	35	23	33	27	27	26
31	31	23	33	22	30	29	27	44	36	24	34	28	28	27
32	32	24	33	24	31	30	28	45	37	24	34	29	28	28
33	32	25	34	25	32	31	30	45	38	25	35	30	29	29
34	33	26	35	26	32	32	31	46	39	25	36	31	30	31
35	34	27	35	27	33	33	32	46	40	26	36	32	31	32
36	35	28	36	28	34	34	34	47	41	26	37	33	32	33
37	35	29	36	30	34	36	35	47	42	27	38	34	32	35
38	36	31	37	31	35	37	37	48	44	27	39	36	33	37
39	37	32	38	33	36	38	38	48	45	28	39	37	34	38
40	38	34	38	34	36	39	40	49	46	28	40	38	35	40

TABLE 6 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST
INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 VOCABULARY

RAW SCORE ITBS 11-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-6	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	38	35	39	36	37	40	42	49	47	29	41	39	36	42
42	39	37	39	38	37	42	44	49	49	29	41	41	37	45

TABLE 7

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
ITBS 12-5	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	3	1	4	1	2	2	1	9	3	3	3	2	2	1
2	6	2	6	2	4	3	2	14	6	6	5	3	4	3
3	8	3	9	3	6	4	3	18	8	7	7	4	6	4
4	10	4	11	4	8	6	4	21	10	9	9	5	8	5
5	11	5	12	4	9	7	5	24	11	10	11	6	9	6
6	13	6	14	5	11	9	6	26	13	11	13	8	10	7
7	14	7	16	6	12	10	7	28	14	12	14	9	12	8
8	15	7	17	7	13	11	8	29	16	13	16	10	13	9
9	16	8	18	8	15	12	9	31	17	14	17	11	14	10
10	17	9	19	8	16	14	10	32	19	15	18	12	15	11
11	18	10	20	9	17	15	11	33	20	16	19	13	16	12
12	19	11	21	10	18	16	12	34	21	16	21	14	17	13
13	20	11	22	11	19	17	13	35	22	17	22	15	18	14
14	21	12	23	12	20	18	14	36	23	17	23	16	18	15
15	22	13	24	12	21	19	14	37	24	18	24	17	19	16
16	23	14	25	13	22	20	15	38	25	19	25	18	20	17
17	24	15	26	14	23	21	16	39	26	19	26	19	21	17
18	24	15	27	15	24	22	17	39	27	20	27	20	21	18
19	25	16	27	16	25	23	18	40	28	20	27	20	22	19
20	26	17	28	16	25	24	19	41	29	21	28	21	23	20
21	27	18	29	17	26	25	20	41	30	21	29	22	24	21
22	27	18	30	18	27	26	21	42	31	21	30	23	24	22
23	28	19	30	19	28	27	22	42	32	22	31	24	25	23
24	29	20	31	20	28	28	23	43	33	22	31	25	26	24
25	29	21	31	21	29	29	24	43	34	23	32	26	26	25
26	30	22	32	21	30	30	25	44	35	23	33	27	27	26
27	31	22	32	22	30	31	26	44	36	24	33	28	28	27
28	31	23	33	23	31	32	27	45	37	24	34	28	28	28
29	32	24	34	24	31	32	28	45	37	24	35	29	29	29
30	32	25	34	25	32	33	29	46	38	25	35	30	29	30
31	33	26	35	26	32	34	30	46	39	25	36	31	30	31
32	34	26	35	27	33	35	31	46	40	25	36	32	31	32
33	34	27	35	28	33	35	32	47	41	26	37	33	31	33
34	35	28	36	29	34	36	33	47	41	26	37	33	32	34
35	35	29	36	30	34	37	34	47	42	27	38	34	32	35
36	36	30	37	30	35	38	35	48	43	27	38	35	33	36
37	36	31	37	31	35	38	36	48	44	27	39	36	33	37
38	37	32	38	32	36	39	37	48	45	28	39	37	34	38
39	37	33	38	33	36	39	38	48	45	28	40	37	34	39
40	38	34	38	34	36	40	39	49	46	28	40	38	35	40

TABLE 7 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 VOCABULARY

RAW SCORE ITBS 12-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	38	35	39	35	37	41	40	49	47	29	40	39	36	42
42	38	36	39	36	37	41	41	49	47	29	41	39	36	43
43	39	37	39	37	37	42	42	49	48	29	41	40	37	44
44	39	38	39	38	37	42	43	49	49	29	41	41	37	45
45	39	39	39	39	37	42	44	49	49	29	41	41	37	47

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TABLE 8

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F WORD KNOWLEDGE

RAW SCORE MAT E-F	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-Q	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	2	1	1	1	1	1	1
3	1	1	1	1	1	1	1	2	1	1	1	1	1	1
4	1	1	2	1	1	1	1	3	1	1	1	1	1	1
5	2	1	2	1	1	1	1	4	2	2	1	1	1	1
6	2	1	2	1	1	1	1	5	2	2	2	1	2	1
7	2	1	3	1	2	1	1	6	2	2	2	1	2	1
8	3	1	3	1	2	1	1	7	3	3	2	1	2	1
9	3	1	4	1	2	2	1	8	3	3	3	2	2	1
10	4	1	4	1	3	2	1	9	4	4	3	2	3	2
11	4	1	5	1	3	2	1	10	4	4	4	2	3	2
12	5	2	5	1	3	2	2	11	4	5	4	2	3	2
13	5	2	6	2	4	3	2	12	5	5	5	2	4	2
14	6	2	6	2	4	3	2	13	5	6	5	3	4	3
15	6	2	7	2	4	3	2	14	6	6	6	3	5	3
16	7	2	7	2	5	4	2	15	6	6	6	3	5	3
17	7	3	8	2	5	4	3	16	7	7	7	4	6	3
18	8	3	9	3	6	4	3	17	8	7	7	4	6	4
19	8	3	9	3	6	5	3	18	8	8	8	4	7	4
20	9	4	10	3	7	5	4	19	8	8	9	5	7	4
21	9	4	11	3	8	6	4	20	10	9	9	5	8	5
22	10	4	11	4	8	6	4	21	10	9	10	6	8	5
23	11	5	12	4	9	7	5	22	11	10	11	6	9	6
24	11	5	13	4	10	7	5	23	12	10	11	7	9	6
25	12	5	14	5	10	8	6	24	12	11	12	7	10	7
26	13	6	14	5	11	9	6	25	13	11	13	8	11	7
27	13	6	15	6	12	9	7	26	14	12	14	8	11	8
28	14	7	16	6	12	10	7	27	15	13	15	9	12	8
29	15	7	17	7	13	11	8	28	16	13	15	10	13	9
30	16	8	18	7	14	12	9	29	17	14	16	10	13	10
31	17	8	18	8	15	13	9	30	18	14	17	11	14	10
32	17	9	19	8	16	14	10	31	19	15	18	12	15	11
33	18	10	20	9	17	15	11	32	20	15	19	13	16	12
34	19	11	21	10	18	16	12	33	21	16	20	14	16	13
35	20	11	22	11	19	17	13	34	22	17	21	15	17	14
36	21	12	23	11	20	18	14	35	23	17	23	16	18	15
37	22	13	24	12	21	19	15	36	24	18	24	17	19	16
38	23	14	25	13	22	21	16	38	26	19	25	18	20	17
39	24	15	26	14	23	22	18	39	27	19	26	19	21	18
40	25	16	27	16	25	23	19	40	28	20	27	21	22	19

TABLE 8 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F WORD KNOWLEDGE

RAW SCORE	EQUIVALENT SCORES													
MAT E-F	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	26	17	29	17	26	25	21	41	30	21	29	22	23	21
42	28	19	30	18	27	27	22	42	32	22	30	24	25	22
43	29	20	31	20	29	28	24	43	33	22	32	25	26	24
44	30	22	32	22	30	30	26	44	35	23	33	27	27	26
45	32	24	33	24	31	32	29	45	37	24	34	29	29	28
46	33	26	35	26	33	34	31	46	39	25	36	31	30	31
47	35	28	36	29	34	36	34	47	41	26	37	33	32	34
48	36	31	37	32	35	38	37	48	44	27	39	36	34	37
49	38	35	39	35	37	41	41	49	47	29	40	39	36	42

TABLE 9

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F WORD KNOWLEDGE

RAW SCORE	EQUIVALENT SCORES													
MAT I-F	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-Q	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	3	1	1	1	1	1	1
2	2	1	2	1	1	1	1	6	2	2	2	1	2	1
3	3	1	4	1	2	2	1	9	3	3	3	1	2	1
4	4	1	5	1	3	2	1	11	4	4	4	2	3	2
5	5	2	6	2	4	3	2	13	5	5	5	3	4	2
6	6	2	7	2	5	3	2	15	6	6	6	3	5	3
7	7	3	8	2	5	4	3	17	7	7	7	4	6	3
8	8	3	9	3	6	5	3	19	8	8	8	4	6	4
9	9	4	10	3	7	5	4	20	9	9	9	5	7	5
10	10	4	11	4	8	6	4	22	10	9	10	6	8	5
11	11	5	12	4	9	7	5	23	11	10	11	6	9	6
12	12	5	13	5	10	8	5	25	12	11	12	7	10	6
13	13	6	14	5	11	9	6	26	13	11	13	8	10	7
14	13	6	15	6	12	9	7	27	14	12	14	8	11	8
15	14	7	16	6	13	10	7	28	15	13	15	9	12	8
16	15	7	17	7	14	11	8	29	16	13	16	10	13	9
17	16	8	18	7	14	12	9	30	17	14	17	11	14	10
18	17	9	19	8	15	13	10	31	18	14	18	11	14	11
19	18	9	20	9	16	14	10	32	19	15	19	12	15	11
20	19	10	21	9	17	15	11	33	20	16	20	13	16	12
21	19	11	21	10	18	16	12	34	21	16	21	14	17	13
22	20	11	22	11	19	17	13	35	22	17	22	15	17	14
23	21	12	23	11	20	18	14	36	23	17	23	16	18	14
24	22	13	24	12	21	19	15	37	24	18	23	16	19	15
25	23	14	25	13	22	20	16	38	25	18	24	17	20	16
26	23	14	26	14	23	21	17	38	26	19	25	18	20	17
27	24	15	26	14	23	22	18	39	27	19	26	19	21	18
28	25	16	27	15	24	23	19	40	28	20	27	20	22	19
29	26	17	28	16	25	24	20	40	29	20	28	21	23	20
30	26	17	29	17	26	25	21	41	30	21	29	22	23	21
31	27	18	29	18	27	26	22	42	31	21	30	23	24	22
32	28	19	30	19	28	27	23	42	32	22	30	24	25	23
33	29	20	31	20	28	28	24	43	33	22	31	25	26	24
34	29	21	31	21	29	29	25	43	34	23	32	26	26	25
35	30	22	32	22	30	30	26	44	35	23	33	27	27	26
36	31	23	33	23	30	31	27	44	36	24	34	28	28	27
37	32	24	33	24	31	32	29	45	37	24	34	29	28	28
38	32	25	34	25	32	33	30	45	38	25	35	30	29	29
39	33	26	35	26	32	34	31	46	39	25	36	31	30	31
40	34	27	35	27	33	35	32	46	40	26	36	32	31	32

TABLE 9 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F WORD KNOWLEDGE

RAW SCORE	EQUIVALENT SCORES													
MAT I-F	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	34	28	36	28	34	36	33	47	41	26	37	33	31	33
42	35	29	36	29	34	37	35	47	42	26	38	34	32	34
43	36	30	37	30	35	38	36	48	43	27	38	35	33	36
44	36	31	37	32	35	38	37	48	44	27	39	36	34	37
45	37	32	38	33	36	39	39	48	45	28	39	37	34	39
46	38	34	38	34	36	40	40	49	46	28	40	38	35	40
47	38	35	39	36	37	41	41	49	47	29	40	39	36	42
48	39	36	39	37	37	41	43	49	48	29	41	40	36	44
49	39	38	39	38	37	42	44	49	49	29	41	41	37	46

TABLE 10

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

STEP II LEVEL 4 FORM A PART 1 (VOCAB.)

RAW SCORE	EQUIVALENT SCORES													
STEP 4-A	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-B	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	3	1	1	1	1	1	1
2	2	1	2	1	1	1	1	6	2	2	2	1	1	1
3	3	1	3	1	2	1	1	8	3	2	3	1	2	1
4	4	1	4	1	3	2	1	11	4	3	3	2	3	2
5	5	2	6	2	4	3	2	13	5	4	5	2	4	2
6	6	2	7	2	4	3	2	15	6	5	6	3	5	3
7	7	3	8	2	5	4	3	17	7	6	7	4	6	3
8	8	3	9	3	7	5	3	19	8	7	8	4	7	4
9	10	4	11	4	8	6	4	21	10	8	9	5	8	5
10	11	5	12	4	9	7	5	23	11	9	11	6	9	6
11	12	5	14	5	10	8	6	25	12	10	12	7	10	7
12	13	6	15	6	12	9	7	27	14	11	14	8	11	8
13	15	7	17	7	13	11	8	29	16	12	15	9	12	9
14	16	8	18	8	15	12	9	31	17	13	17	11	14	10
15	18	9	20	9	16	14	10	32	19	14	19	12	15	11
16	19	10	21	10	18	16	12	34	21	16	20	14	16	13
17	21	12	23	11	19	17	13	35	22	17	22	15	18	14
18	22	13	24	12	21	19	15	37	24	18	24	17	19	16
19	24	14	26	14	23	21	17	38	26	19	26	19	21	17
20	25	16	27	15	25	23	19	40	28	20	27	20	22	19
21	27	18	29	17	26	25	21	41	30	21	29	22	24	21
22	28	19	30	19	28	27	23	42	32	22	31	24	25	23
23	30	21	32	21	29	30	26	44	34	23	32	26	27	25
24	31	23	33	23	31	32	28	45	37	24	34	28	28	28
25	33	25	34	25	32	34	31	46	39	25	36	31	30	30
26	34	28	36	28	34	36	33	47	41	26	37	33	31	33
27	36	30	37	31	35	38	36	48	43	27	38	35	33	36
28	37	33	38	33	36	39	39	48	45	28	40	37	35	39
29	39	36	39	37	37	41	42	49	48	29	41	40	36	43

TABLE 11

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
SRA BL-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	4	1	1	1	1	1	1
2	2	1	3	1	2	1	1	7	2	2	1	1	2	1
3	3	1	4	1	2	2	1	9	3	4	2	2	3	2
4	5	2	5	1	3	2	2	12	4	5	3	2	3	2
5	6	2	6	2	4	3	2	14	5	5	4	3	4	3
6	7	2	7	2	5	4	2	16	6	6	4	3	5	3
7	7	3	8	3	6	4	3	18	7	7	5	4	6	4
8	8	3	9	3	7	5	3	19	8	8	6	4	7	4
9	9	4	10	3	7	6	4	21	9	9	7	5	7	5
10	10	4	11	4	8	6	4	22	10	9	7	6	8	5
11	11	5	12	4	9	7	5	24	11	10	8	6	9	6
12	12	5	13	5	10	8	6	25	12	11	9	7	10	7
13	13	6	14	5	11	9	6	26	13	12	10	8	11	7
14	14	6	15	6	12	10	7	27	14	12	11	9	11	8
15	15	7	16	6	13	11	8	28	15	13	12	9	12	9
16	15	8	17	7	14	11	8	30	16	13	13	10	13	9
17	16	8	18	8	15	12	9	31	17	14	14	11	14	10
18	17	9	19	8	16	13	10	32	18	15	15	12	15	11
19	18	10	20	9	17	14	11	33	19	15	16	12	15	12
20	19	10	21	10	18	15	11	34	20	16	16	13	16	12
21	20	11	22	10	19	16	12	35	21	16	17	14	17	13
22	21	12	23	11	19	17	13	35	22	17	18	15	18	14
23	21	12	24	12	20	18	14	36	24	18	20	16	19	15
24	22	13	24	13	21	20	15	37	25	18	21	17	19	16
25	23	14	25	13	22	21	16	38	26	19	22	18	20	17
26	24	15	26	14	23	22	17	39	27	19	23	19	21	18
27	25	16	27	15	24	23	19	40	28	20	24	20	22	19
28	26	17	28	16	25	24	20	40	29	20	25	21	23	20
29	27	18	29	17	26	25	21	41	30	21	26	22	24	21
30	28	19	30	18	27	27	22	42	31	22	27	23	24	22
31	28	20	31	19	28	28	24	43	33	22	28	25	25	24
32	29	21	31	21	29	29	25	43	34	23	29	26	26	25
33	30	22	32	22	30	30	26	44	35	23	31	27	27	26
34	31	23	33	23	31	32	28	45	37	24	32	28	28	28
35	32	24	34	25	32	33	30	45	38	25	33	30	29	29
36	33	26	35	26	33	34	31	46	39	25	34	31	30	31
37	34	27	36	28	34	36	33	47	41	26	36	33	31	33
38	35	29	36	30	34	37	35	47	42	27	37	34	32	35
39	36	31	37	32	35	38	37	48	44	27	38	36	34	37
40	38	34	38	34	36	40	40	49	46	28	39	38	35	40

TABLE 11 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

- SRA BLUE FORM E VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
SRA BL-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
41	39	36	39	37	37	41	43	45	48	29	41	40	36	43

TABLE 12

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E VOCABULARY

RAW SCORE SRA GR-E	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
1	2	1	3	1	2	1	1	7	2	2	2	1	2	1
2	4	2	5	1	3	2	2	11	4	4	4	2	3	2
3	6	2	7	2	5	3	2	15	6	6	6	2	5	3
4	8	3	9	3	6	4	3	18	8	7	7	3	6	4
5	9	4	10	3	7	6	4	21	9	9	9	4	7	5
6	11	4	12	4	9	7	5	23	11	10	10	5	9	6
7	12	5	13	5	10	8	6	25	12	11	12	6	10	6
8	13	6	15	5	11	9	6	26	14	12	13	7	11	7
9	14	7	16	6	13	10	7	28	15	13	15	8	12	8
10	15	8	17	7	14	11	8	30	16	13	16	8	13	9
11	16	8	18	8	15	13	9	31	18	14	17	9	14	10
12	18	9	20	9	16	14	10	32	19	15	18	10	15	11
13	19	10	21	9	17	15	11	33	20	16	20	11	16	12
14	20	11	22	10	18	16	12	34	21	16	21	12	17	13
15	20	12	23	11	19	17	13	35	22	17	22	13	18	14
16	21	12	24	12	20	18	14	36	23	18	23	14	19	15
17	22	13	24	13	21	20	15	37	25	18	24	15	19	16
18	23	14	25	13	22	21	16	38	26	19	25	16	20	17
19	24	15	26	14	23	22	17	39	27	19	26	17	21	18
20	25	16	27	15	24	23	18	40	28	20	27	18	22	19
21	26	17	28	16	25	24	20	40	29	20	28	18	23	20
22	26	17	29	17	26	25	21	41	30	21	29	19	23	21
23	27	18	29	18	27	26	22	42	31	21	30	20	24	22
24	28	19	30	19	28	27	23	42	32	22	31	21	25	23
25	29	20	31	20	28	28	24	43	33	22	31	22	26	24
26	30	21	31	21	29	29	25	43	34	23	32	24	26	25
27	30	22	32	22	30	30	26	44	35	23	33	25	27	26
28	31	23	33	23	31	31	27	44	36	24	34	26	28	27
29	32	24	33	24	31	32	29	45	37	24	34	27	29	28
30	32	25	34	25	32	33	30	45	38	25	35	28	29	30
31	33	26	35	26	32	34	31	46	39	25	36	29	30	31
32	34	27	35	27	33	35	32	46	40	26	36	30	31	32
33	34	28	36	28	34	36	33	47	41	26	37	31	31	33
34	35	29	36	29	34	37	35	47	42	26	38	32	32	34
35	36	30	37	30	35	37	36	48	43	27	38	33	33	36
36	36	31	37	32	35	38	37	48	44	27	39	35	34	37
37	37	32	38	33	36	39	39	48	45	28	39	36	34	39
38	38	34	38	34	36	40	40	49	46	28	40	37	35	40
39	38	35	39	36	37	41	41	49	47	29	40	38	36	42
40	39	36	39	37	37	41	43	49	48	29	41	39	36	44

TABLE 12 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E VOCABULARY

RAW SCORE	EQUIVALENT SCORES												
SRA GR-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
41	39	38	39	38	37	42	44	49	49	29	41	41	37	46

TABLE 13

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE I FORM W WORD MEANING

RAW SCORE	EQUIVALENT SCORES													
SAT I-W	CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-X	SAT II-W
1	1	1	2	1	1	1	1	4	1	2	1	1	1	1
2	3	1	3	1	2	1	1	8	3	3	2	1	2	1
3	4	1	5	1	3	2	1	11	4	4	4	2	3	2
4	5	2	6	2	4	3	2	13	5	5	5	3	4	2
5	6	2	7	2	5	4	2	16	6	6	6	3	5	3
6	8	3	9	3	6	4	3	18	8	7	7	4	6	4
7	9	4	10	3	7	5	4	20	9	8	8	5	7	4
8	10	4	11	4	8	6	4	22	10	9	10	6	8	5
9	11	5	12	4	9	7	5	23	11	10	11	6	9	6
10	12	5	14	5	10	8	6	25	12	11	12	7	10	7
11	13	6	15	6	11	9	7	27	14	12	13	8	11	8
12	14	7	16	6	13	10	7	28	15	13	15	9	12	8
13	15	8	17	7	14	11	8	30	16	13	16	10	13	9
14	17	8	18	8	15	13	9	31	18	14	17	11	14	10
15	18	9	20	9	16	14	10	32	19	15	19	12	15	11
16	19	10	21	9	17	15	11	33	20	16	20	13	16	12
17	20	11	22	10	19	16	12	35	21	16	21	14	16	13
18	21	12	23	11	20	18	14	36	23	17	22	15	17	14
19	22	13	24	12	21	19	15	37	24	18	24	17	18	15
20	23	14	25	13	22	20	16	38	25	19	25	18	19	17
21	24	15	26	14	23	22	17	39	27	19	26	19	20	18
22	25	16	27	15	24	23	19	40	28	20	27	20	21	19
23	26	17	28	16	26	25	20	41	29	21	28	21	22	20
24	27	18	29	18	27	26	22	42	31	21	29	23	23	22
25	28	19	30	19	28	27	23	42	32	22	31	24	24	23
26	29	20	31	20	29	29	25	43	34	23	32	25	25	24
27	30	22	32	22	30	30	26	44	35	23	33	27	26	26
28	31	23	33	23	31	31	28	45	36	24	34	28	27	27
29	32	24	34	24	32	33	29	45	38	25	35	30	28	29
30	33	26	35	26	32	34	31	46	39	25	36	31	29	31
31	34	27	35	27	33	35	33	47	40	26	37	32	30	32
32	35	29	36	29	34	37	35	47	42	26	38	34	31	34
33	36	30	37	31	35	38	36	48	43	27	38	35	32	36
34	37	32	38	32	36	39	38	48	45	28	39	37	33	38
35	38	34	38	34	36	40	40	49	46	28	40	38	34	40
36	38	35	39	36	37	41	42	49	47	29	41	39	35	42
37	39	38	39	38	37	42	44	49	49	29	41	41	37	45

TABLE 14

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W WORD MEANING

RAW SCORE	EQUIVALENT SCORES													
SAT II-W	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
1	3	1	3	1	2	1	1	7	2	3	2	1	2	1
2	5	2	5	1	3	2	2	12	4	5	4	2	4	3
3	7	2	7	2	5	4	2	16	6	6	6	3	5	4
4	8	3	9	3	6	5	3	19	8	8	8	4	7	5
5	10	4	11	4	8	6	4	21	10	9	10	5	8	6
6	11	5	13	4	9	7	5	24	11	10	11	7	9	7
7	13	6	14	5	11	9	6	26	13	11	13	8	10	8
8	14	7	16	6	12	10	7	28	14	12	14	9	12	9
9	15	7	17	7	13	11	8	29	16	13	16	10	13	11
10	16	8	18	8	15	12	9	31	17	14	17	11	14	12
11	17	9	19	8	16	14	10	32	19	15	18	12	15	13
12	18	10	21	9	17	15	11	33	20	16	20	13	16	14
13	20	11	22	10	18	16	12	34	21	16	21	14	17	15
14	21	12	23	11	19	17	13	35	22	17	22	15	18	16
15	21	13	24	12	21	19	14	36	24	18	23	16	19	17
16	22	13	25	13	22	20	15	37	25	18	24	17	20	18
17	23	14	26	14	23	21	17	38	26	19	25	18	20	19
18	24	15	26	14	23	22	18	39	27	19	26	19	21	20
19	25	16	27	15	24	23	19	40	28	20	27	20	22	21
20	26	17	28	16	25	24	20	40	29	20	28	21	23	22
21	27	18	29	17	26	25	21	41	30	21	29	22	24	23
22	27	18	29	18	27	26	22	42	31	21	30	23	24	23
23	28	19	30	19	28	27	23	42	32	22	31	24	25	24
24	29	20	31	20	28	28	24	43	33	22	31	25	26	25
25	30	21	31	21	29	29	25	43	34	23	32	26	26	26
26	30	22	32	22	30	30	26	44	35	23	33	27	27	27
27	31	23	33	22	30	31	27	44	36	24	34	28	28	28
28	31	23	33	23	31	32	28	45	37	24	34	29	28	29
29	32	24	34	24	32	33	29	45	38	24	35	30	29	30
30	33	25	34	25	32	33	30	46	38	25	35	30	30	31
31	33	26	35	26	33	34	31	46	39	25	36	31	30	32
32	34	27	35	27	33	35	32	46	40	26	36	32	31	33
33	34	27	36	28	34	36	33	47	41	26	37	33	31	34
34	35	28	36	29	34	36	34	47	42	26	37	34	32	35
35	35	29	36	30	34	37	35	47	42	27	38	34	32	36
36	36	30	37	31	35	38	36	48	43	27	38	35	33	37
37	36	31	37	31	35	38	37	48	44	27	39	36	33	38
38	37	32	37	32	36	39	38	48	45	28	39	37	34	38
39	37	33	38	33	36	39	39	48	45	28	40	37	34	39
40	37	33	38	34	36	40	40	49	46	28	40	38	35	40

TABLE 14 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W WORD MEANING

RAW SCORE SAT II-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
41	38	34	38	35	36	40	41	49	46	28	40	38	35	41
42	38	35	39	36	37	41	41	49	47	29	41	39	36	42
43	39	36	39	36	37	41	42	49	48	29	41	40	36	43
44	39	37	39	37	37	42	43	49	48	29	41	40	37	44
45	39	38	39	38	37	42	44	49	49	29	41	41	37	45
46	39	38	39	39	37	42	44	49	49	29	41	41	37	46
47	39	39	39	39	37	42	45	49	49	29	41	41	37	47

Appendix D

Equating Tables - Comprehension

TABLE 1

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 3 FORM A COMPREHENSION

RAW SCORE	EQUIVALENT SCORES													
CAT 3-A	CAT 3-B	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
2	1	1	2	1	2	2	1	3	1	1	2		2	1
3	2	1	3	1	3	2	1	5	2	1	3	1	3	1
4	3	2	4	1	4	3	2	7	3	2	4	2	5	2
5	4	2	5	2	6	4	2	8	4	2	5	2	6	2
6	4	2	6	2	7	5	2	10	5	3	6	3	7	3
7	5	3	8	3	8	6	3	11	6	3	7	3	9	4
8	6	3	9	3	10	7	4	12	6	4	8	4	10	4
9	7	4	10	4	11	8	4	14	7	4	9	4	11	5
10	8	4	11	4	13	10	5	15	8	5	10	5	13	6
11	8	5	12	5	14	11	6	16	9	5	11	6	14	7
12	9	5	14	6	16	12	6	18	10	6	13	6	15	7
13	10	6	15	6	17	13	7	19	11	7	14	7	17	8
14	11	7	16	7	19	15	8	20	12	7	15	8	18	9
15	12	7	17	8	20	16	9	21	13	8	16	9	20	10
16	13	8	18	9	22	18	10	22	14	9	17	10	21	11
17	13	8	20	9	24	19	11	24	15	10	18	10	23	12
18	14	9	21	10	26	21	12	25	16	10	19	11	24	13
19	15	10	22	11	27	23	13	26	17	11	21	12	25	14
20	16	11	23	12	29	24	15	27	18	12	22	13	27	16
21	17	11	24	13	31	26	16	28	19	13	23	15	28	17
22	18	12	26	14	33	28	18	29	20	13	24	16	30	18
23	19	13	27	15	34	30	19	30	21	14	26	17	31	20
24	20	14	28	16	36	32	21	31	22	15	27	18	33	21
25	21	15	29	17	38	33	22	33	23	16	28	19	34	23
26	22	16	30	19	40	35	24	33	25	17	29	21	36	24
27	23	17	31	20	42	38	26	34	26	17	30	22	37	26
28	24	18	32	21	43	40	28	35	27	18	32	23	39	27
29	25	19	33	22	45	42	30	36	28	19	33	25	40	29
30	26	21	34	24	47	44	33	37	29	20	34	26	42	31
31	27	22	35	25	49	46	35	38	31	21	35	28	43	33
32	28	23	36	27	51	49	38	38	32	22	37	29	45	35
33	29	25	37	28	53	51	41	39	33	23	38	31	46	37
34	30	26	38	30	54	53	44	40	34	24	39	33	48	40
35	31	28	39	32	56	56	47	41	36	24	40	35	49	42
36	33	30	40	33	58	58	50	41	37	25	41	36	51	45
37	34	32	41	35	60	61	54	42	38	26	43	38	52	47
38	35	34	42	37	61	63	58	43	40	27	44	40	54	50
39	37	36	43	39	63	66	62	43	41	28	45	42	55	53
40	38	39	43	41	65	69	66	44	42	28	46	44	57	57

TABLE 1 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 3 FORM A COMPREHENSION

RAW SCORE	EQUIVALENT SCORES													
CAT 3-A	CAT 3-B	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	40	42	44	43	66	71	71	44	44	29	47	46	58	60

TABLE 2

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 4 FORM A COMPREHENSION

RAW SCORE CAT 4-A	EQUIVALENT SCORES CAT 3-A	CAT 4-B	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT 1-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	3	1	3	1	3	2	1	5	2	1	3	1	3	1
2	5	1	5	2	6	4	2	8	4	2	5	2	6	3
3	7	2	8	3	9	7	3	12	6	3	8	3	9	4
4	9	2	11	4	12	9	4	14	8	5	10	5	12	5
5	11	3	13	5	15	11	6	17	9	6	12	6	15	7
6	13	3	15	6	17	14	7	19	11	7	14	7	17	8
7	15	4	17	8	20	16	9	21	13	8	16	9	19	10
8	16	4	19	9	23	18	10	23	14	9	18	10	22	12
9	18	5	21	10	25	21	12	25	16	10	19	11	24	13
10	19	6	22	11	28	23	14	26	17	11	21	13	26	15
11	21	6	24	13	30	25	15	27	19	12	22	14	28	16
12	22	7	25	14	32	27	17	29	20	13	24	15	29	18
13	23	7	27	15	34	29	19	30	21	14	25	17	31	19
14	24	8	28	16	36	32	21	31	22	15	27	18	33	21
15	25	9	29	17	38	34	23	32	24	16	28	19	34	23
16	26	10	30	19	40	36	24	33	25	17	29	21	36	24
17	27	10	31	20	42	38	26	34	26	17	30	22	37	26
18	28	11	32	21	43	39	28	35	27	18	32	23	38	27
19	29	12	33	22	45	41	30	36	28	19	33	24	40	29
20	30	12	34	23	46	43	32	36	29	20	34	26	41	30
21	30	13	35	24	48	45	34	37	30	20	35	27	42	32
22	31	14	36	25	49	47	36	38	31	21	36	28	43	33
23	32	15	36	27	50	48	38	38	32	22	36	29	44	35
24	33	16	37	28	52	50	39	39	32	22	37	30	45	36
25	33	17	38	29	53	51	41	39	33	23	38	31	46	38
26	34	18	38	30	54	53	43	40	34	23	39	33	47	39
27	34	18	39	31	55	54	45	40	35	24	40	34	48	41
28	35	19	39	32	56	56	47	41	36	24	40	35	49	42
29	36	20	40	33	57	57	49	41	36	25	41	36	50	44
30	36	21	40	33	58	59	51	41	37	25	42	37	51	45
31	37	22	41	34	59	60	53	42	38	26	42	38	52	46
32	37	24	41	35	60	61	54	42	38	26	43	38	52	48
33	38	25	42	36	61	62	56	42	39	27	43	39	53	49
34	38	26	42	37	62	64	58	43	40	27	44	40	54	50
35	38	27	42	38	62	65	60	43	40	27	44	41	55	52
36	39	28	43	39	63	66	61	43	41	28	45	42	55	53
37	39	30	43	39	64	67	63	43	41	28	45	43	56	54
38	40	31	43	40	64	68	65	44	42	28	46	43	56	56
39	40	33	44	41	65	69	67	44	42	28	46	44	57	57
40	40	34	44	42	65	70	68	44	43	29	46	45	58	58

TABLE 2 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 4 FORM A COMPREHENSION

RAW SCORE	EQUIVALENT SCORES												
CAT 4-A	CAT 5-A	CAT 4-B	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	41	36	44	42	66	71	70	44	43	29	47	45	58	59
42	41	38	44	43	67	72	71	44	44	29	47	46	59	60
43	41	40	44	44	67	72	73	44	44	29	47	47	59	62
44	41	42	44	44	67	73	74	44	44	29	47	47	59	63

TABLE 3

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 2 FORM Q COMPREHENSION

RAW SCORE CTBS 2-Q	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-R	CTBS 3-Q	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
2	2	1	1	1	2	2	1	4	2	1	2	1	2	1
3	3	1	1	1	3	2	1	5	2	1	3	1	3	1
4	4	2	1	1	4	3	1	6	3	2	4	2	5	2
5	5	2	2	2	5	4	2	8	4	2	5	2	6	2
6	6	2	2	2	6	5	2	9	4	2	6	2	7	3
7	7	3	3	3	8	6	3	10	5	3	7	3	8	3
8	7	3	3	3	9	6	3	11	6	3	8	3	9	4
9	8	3	4	3	10	7	3	13	7	4	8	4	10	4
10	9	4	5	4	11	8	4	14	7	4	9	4	11	5
11	10	4	5	4	12	9	4	15	8	5	10	5	12	6
12	11	5	6	5	14	10	5	16	9	5	11	5	14	6
13	11	5	7	5	15	11	6	17	10	6	12	6	15	7
14	12	6	8	6	16	13	7	18	10	6	13	7	16	8
15	13	6	8	6	17	14	7	19	11	7	14	7	17	8
16	14	7	9	7	19	15	8	20	12	7	15	8	18	9
17	15	7	10	8	20	16	9	21	13	8	16	9	19	10
18	16	8	11	8	21	17	10	22	14	9	17	9	21	11
19	16	8	11	9	23	18	10	23	14	9	18	10	22	12
20	17	9	12	10	24	20	11	24	15	10	19	11	23	12
21	18	9	13	10	26	21	12	25	16	10	20	12	24	13
22	19	10	14	11	27	22	13	26	17	11	21	12	25	14
23	20	10	15	12	29	24	14	27	18	12	22	13	27	15
24	21	11	16	13	30	25	16	28	19	12	23	14	28	16
25	22	12	16	14	32	27	17	29	20	13	24	15	29	18
26	22	13	17	14	33	28	18	29	21	14	25	16	30	19
27	23	13	18	15	35	30	19	30	22	14	26	17	32	20
28	24	14	19	16	36	32	21	31	23	15	27	18	33	21
29	25	15	20	17	38	34	22	33	24	16	28	19	34	23
30	26	16	22	18	40	35	24	33	25	17	29	21	35	24
31	27	17	23	20	41	37	26	34	26	17	30	22	37	25
32	28	18	24	21	43	39	28	35	27	18	31	23	38	27
33	29	19	25	22	45	41	30	36	28	19	33	24	40	29
34	30	20	26	23	46	43	32	36	29	20	34	26	41	30
35	31	21	28	25	48	45	34	37	30	21	35	27	42	32
36	32	23	29	26	50	48	37	38	31	21	36	29	44	34
37	33	24	30	28	52	50	40	39	33	22	37	30	45	37
38	34	26	32	29	54	53	43	40	34	23	39	32	47	39
39	35	27	33	31	56	55	46	40	35	24	40	34	49	41
40	36	29	35	33	58	58	50	41	37	25	41	36	50	44

TABLE 3 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 2 FORM Q COMPREHENSION

RAW SCORE	EQUIVALENT SCORES													
CTBS 2-C	CAT 3-A	CAT 4-A	CTBS 2-R	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-S	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	37	32	37	35	60	61	54	42	38	26	42	38	52	47
42	38	34	39	37	62	64	58	43	40	27	44	40	54	51
43	39	37	41	39	64	67	63	43	41	28	45	43	56	54
44	41	41	43	42	66	70	69	44	43	29	47	45	58	59

TABLE 4

EQUATING TABLES FOR CONVERTING RAW SCORES ON A EASE TEST
INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 3 FORM Q COMPREHENSION

RAW SCORE CTBS 3-Q	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-R	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	3	1	3	1	3	2	1	5	2	1	3	1	4	1
2	6	2	6	1	6	5	2	9	4	2	6	2	7	3
3	8	3	8	2	9	7	3	12	6	3	8	3	9	4
4	9	4	10	3	12	9	4	14	8	5	10	5	12	5
5	11	5	12	3	14	11	6	16	9	6	12	6	14	7
6	13	6	14	4	17	13	7	18	11	6	13	7	16	8
7	14	7	16	5	19	15	8	20	12	7	15	8	18	9
8	15	7	18	5	21	17	9	22	13	8	16	9	20	10
9	17	8	19	6	23	19	11	23	15	9	18	10	22	12
10	18	9	21	7	25	21	12	24	16	10	19	11	24	13
11	19	10	22	8	27	22	13	26	17	11	21	12	25	14
12	20	11	23	9	29	24	15	27	18	12	22	13	27	16
13	21	11	24	9	31	26	16	28	19	13	23	15	28	17
14	22	12	25	10	32	28	17	29	20	13	24	16	30	18
15	23	13	27	11	34	29	19	30	21	14	25	17	31	19
16	24	14	28	12	36	31	20	31	22	15	26	18	32	21
17	25	15	29	13	37	33	22	32	23	16	28	19	34	22
18	26	15	30	14	39	35	23	33	24	16	29	20	35	23
19	26	16	30	15	40	36	25	33	25	17	30	21	36	25
20	27	17	31	16	42	38	27	34	26	18	31	22	37	26
21	28	18	32	17	43	39	28	35	27	18	32	23	38	27
22	29	19	33	18	45	41	30	36	28	19	33	24	40	29
23	29	20	34	19	46	43	31	36	29	20	33	25	41	30
24	30	21	34	20	47	44	33	37	29	20	34	27	42	31
25	31	22	35	21	49	46	35	37	30	21	35	28	43	33
26	32	23	36	22	50	47	37	38	31	21	36	29	44	34
27	32	23	37	23	51	49	38	39	32	22	37	30	45	36
28	33	24	37	24	52	51	40	39	33	23	38	31	46	37
29	33	25	38	25	53	52	42	40	34	23	38	32	47	38
30	34	26	38	26	54	54	44	40	34	24	39	33	48	40
31	35	27	39	27	56	55	46	40	35	24	40	34	49	41
32	35	28	40	28	56	57	48	41	36	25	41	35	50	43
33	36	29	40	29	57	58	50	41	37	25	41	36	50	44
34	36	31	41	31	58	59	52	42	37	26	42	37	51	46
35	37	32	41	32	59	60	54	42	38	26	43	38	52	47
36	38	33	41	33	60	61	56	42	39	26	43	39	53	49
37	38	34	42	34	61	62	58	43	40	27	44	40	54	50
38	39	35	42	35	62	64	60	43	40	27	44	41	55	52
39	39	36	43	37	63	65	62	43	41	28	45	42	55	54
40	40	38	43	38	64	66	64	44	42	28	45	43	56	55

TABLE 4 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 3 FORM Q COMPREHENSION

RAW SCORE CTBS 3-C	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-R	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT 1-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	40	39	44	39	65	69	67	44	42	28	46	44	57	57
42	41	40	44	41	66	70	69	44	43	29	46	45	58	59
43	41	42	44	42	66	71	71	44	44	29	47	46	58	60
44	41	43	44	43	67	73	74	44	44	29	47	47	59	62

TABLE 5

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 10 FORM 5 COMPREHENSION

RAW SCORE ITBS 10-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-6	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
2	2	1	2	1	1	2	1	3	1	1	2	1	2	1
3	3	1	4	1	3	3	1	5	2	1	3	1	3	2
4	4	1	5	1	3	4	2	6	3	2	4	1	4	2
5	5	2	6	2	4	4	2	7	3	2	5	2	5	2
6	5	2	7	2	5	5	3	8	4	2	5	2	6	3
7	6	2	7	2	5	6	3	10	5	2	6	3	7	3
8	7	3	7	3	6	6	3	11	5	3	7	3	8	4
9	8	3	8	3	7	7	3	12	6	3	8	3	9	4
10	8	3	9	3	7	8	4	13	7	4	8	4	10	4
11	9	4	10	4	8	8	4	14	7	4	9	4	11	5
12	10	4	11	4	9	9	5	15	8	5	10	5	12	5
13	10	4	12	5	10	10	5	15	8	5	11	5	13	6
14	11	5	12	5	11	11	6	16	9	5	11	6	14	7
15	12	5	13	5	12	12	6	17	10	6	12	6	15	7
16	12	6	14	6	12	12	7	18	10	6	13	6	16	8
17	13	6	15	6	13	13	7	19	11	7	14	7	17	8
18	13	6	15	7	14	14	8	19	12	7	14	7	18	9
19	14	7	16	7	15	15	8	20	12	7	15	8	18	9
20	15	7	17	8	16	16	9	21	13	8	16	8	19	10
21	15	7	18	8	17	17	9	22	14	8	16	9	20	10
22	16	8	18	8	18	18	10	22	15	9	17	10	21	11
23	17	8	19	9	19	19	11	23	15	9	18	10	22	12
24	17	9	20	9	20	20	11	24	15	10	18	11	23	12
25	18	9	21	10	21	20	12	24	16	10	19	11	23	13
26	18	9	21	10	22	21	13	25	16	10	20	12	24	14
27	19	10	22	11	23	22	13	26	17	11	21	12	25	14
28	19	10	23	12	24	23	14	26	17	11	21	13	26	15
29	20	11	23	12	24	24	15	27	18	12	22	13	27	16
30	21	11	24	13	25	25	15	28	19	12	23	14	28	16
31	21	12	25	13	26	26	16	28	19	13	23	15	28	17
32	22	12	25	14	27	27	17	29	20	13	24	15	29	18
33	22	12	26	14	28	28	18	29	20	14	25	16	30	19
34	23	13	27	15	29	29	19	30	21	14	25	17	31	19
35	23	13	27	16	30	30	20	30	22	14	26	17	32	20
36	24	14	28	16	32	31	21	31	22	15	27	18	33	21
37	24	14	28	17	33	32	22	32	23	15	27	19	33	22
38	25	15	29	17	34	34	22	32	24	16	28	19	34	23
39	26	16	30	18	35	35	23	33	24	16	29	20	35	23
40	26	16	30	19	36	36	25	33	25	17	29	21	36	24

TABLE 5 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 10 FORM 5 COMPREHENSION

RAW SCORE ITBS 10-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-6	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	27	17	31	19	37	37	26	34	25	17	30	22	37	25
42	27	17	31	20	38	38	27	34	26	18	31	22	37	26
43	28	18	32	21	39	39	28	35	27	18	31	23	38	27
44	28	18	33	22	40	40	29	35	27	19	32	24	39	28
45	29	19	33	22	41	42	30	36	28	19	33	25	40	29
46	29	20	34	23	42	43	31	36	29	20	33	25	41	30
47	30	20	34	24	43	44	33	37	29	20	34	26	41	31
48	31	21	35	25	44	45	34	37	30	21	35	27	42	32
49	31	22	35	25	46	46	35	38	31	21	35	28	43	33
50	32	23	36	26	47	48	37	38	31	21	36	29	44	34
51	32	23	37	27	48	49	38	39	32	22	37	30	45	36
52	33	24	37	28	49	50	40	39	33	22	37	31	46	37
53	33	25	38	29	50	52	41	39	33	23	38	32	46	38
54	34	26	38	30	51	53	43	40	34	23	39	32	47	39
55	34	27	39	30	52	54	45	40	35	24	39	33	48	41
56	35	28	39	31	54	56	47	41	35	24	40	34	49	42
57	35	29	40	32	55	57	48	41	36	25	41	35	50	43
58	36	30	40	33	56	58	50	41	37	25	41	36	51	45
59	37	31	41	34	57	60	52	42	38	26	42	37	52	46
60	37	32	41	35	58	61	54	42	38	26	43	39	53	48
61	38	33	42	36	60	63	57	43	39	27	43	40	53	49
62	38	35	42	38	61	64	59	43	40	27	44	41	54	51
63	39	36	43	39	62	66	61	43	41	28	45	42	55	53
64	39	37	43	40	63	67	64	44	42	28	45	43	56	55
65	40	39	44	41	64	69	67	44	42	29	46	44	57	57
66	41	41	44	42	66	71	70	44	43	29	47	45	58	59
67	41	43	44	44	67	72	73	44	44	29	47	47	59	61

TABLE 6

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 COMPREHENSION

RAW SCORE ITBS 11-S	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-C	ITBS 10-S	ITBS 11-E	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	2	1	1	1	1	1	1	5	1	1	1	1	2	1
2	3	1	3	1	3	1	1	5	2	1	3	1	3	1
3	4	2	4	1	4	2	1	6	3	2	4	2	5	2
4	5	2	5	2	6	2	2	8	4	2	5	2	6	2
5	6	2	6	2	7	3	2	9	5	3	6	3	7	3
6	7	3	7	3	8	3	3	11	5	3	7	3	8	4
7	8	3	9	3	9	4	3	12	6	4	8	4	10	4
8	9	4	10	4	11	4	4	13	7	4	9	4	11	5
9	10	4	11	4	12	5	5	14	8	5	10	5	12	5
10	10	5	12	5	13	6	5	16	9	5	11	5	13	6
11	11	5	13	5	14	6	6	17	9	6	12	6	14	7
12	12	5	14	6	16	7	6	18	10	6	13	6	15	7
13	13	6	14	6	17	8	7	18	11	7	13	7	16	8
14	13	6	15	7	18	8	8	19	11	7	14	7	17	9
15	14	7	16	7	19	9	8	20	12	7	15	8	18	9
16	15	7	17	8	20	10	9	21	13	8	16	9	19	10
17	15	7	18	8	21	10	9	22	13	8	17	9	20	11
18	16	8	19	9	22	11	10	23	14	9	17	10	21	11
19	17	8	19	9	23	12	11	23	15	9	18	10	22	12
20	17	9	20	10	25	12	12	24	15	10	19	11	23	13
21	18	9	21	10	26	13	12	25	16	10	20	12	24	13
22	19	10	22	11	27	14	13	25	17	11	20	12	25	14
23	19	10	22	11	28	15	14	26	17	11	21	13	26	15
24	20	10	23	12	29	15	15	27	18	12	22	13	27	15
25	20	11	24	12	30	16	15	27	19	12	22	14	27	16
26	21	11	24	13	31	17	16	28	19	13	23	15	28	17
27	22	12	25	14	32	18	17	29	20	13	24	15	29	18
28	22	12	26	14	33	19	18	29	20	13	24	16	30	18
29	23	13	26	15	34	20	19	30	21	14	25	16	31	19
30	23	13	27	15	35	20	19	30	21	14	26	17	31	20
31	24	14	28	16	36	21	20	31	22	15	26	18	32	21
32	24	14	28	17	37	22	21	31	23	15	27	18	33	21
33	25	15	29	17	37	23	22	32	23	16	28	19	34	22
34	25	15	29	18	38	24	23	32	24	16	28	20	34	23
35	26	16	30	18	39	25	24	33	24	16	29	20	35	24
36	26	16	30	19	40	26	25	33	25	17	30	21	36	25
37	27	17	31	19	41	27	26	34	25	17	30	22	37	25
38	27	17	31	20	42	28	27	34	26	18	31	22	37	26
39	28	18	32	21	43	29	28	35	27	18	31	23	38	27
40	28	18	32	21	44	30	29	35	27	18	32	24	39	28

TABLE 6 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 COMPREHENSION

RAW SCORE ITBS 11-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-6	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	29	19	33	22	45	31	30	36	28	19	32	24	39	29
42	29	19	33	23	45	32	31	36	28	19	33	25	40	29
43	30	20	34	23	46	33	32	36	29	20	34	26	41	30
44	30	21	34	24	47	34	33	37	29	20	34	26	42	31
45	30	21	35	24	48	35	34	37	30	20	35	27	42	32
46	31	22	35	25	49	36	35	37	30	21	35	28	43	33
47	31	22	36	26	49	37	36	38	31	21	36	28	44	34
48	32	23	36	26	50	38	37	38	31	22	36	29	44	35
49	32	23	37	27	51	39	38	39	32	22	37	30	45	36
50	33	24	37	28	52	41	40	39	32	22	37	30	45	36
51	33	25	37	28	53	42	41	39	33	23	38	31	46	37
52	33	25	38	29	53	43	42	40	34	23	38	32	47	38
53	34	26	38	30	54	44	43	40	34	23	39	33	47	39
54	34	27	39	30	55	45	44	40	35	24	39	33	48	40
55	35	27	39	31	56	46	46	40	35	24	40	34	49	41
56	35	28	39	32	56	48	47	41	36	24	40	35	49	42
57	35	29	40	32	57	49	48	41	36	25	41	35	50	43
58	36	29	40	33	58	50	50	41	37	25	41	36	50	44
59	36	30	40	34	58	52	51	42	37	25	42	37	51	45
60	37	31	41	34	59	53	53	42	38	26	42	38	52	46
61	37	32	41	35	60	54	54	42	38	26	43	38	52	47
62	37	33	41	36	60	56	55	42	39	26	43	39	53	49
63	38	33	42	37	61	57	57	43	39	27	43	40	54	50
64	38	34	42	37	62	59	58	43	40	27	44	40	54	51
65	39	35	42	38	62	60	60	43	40	27	44	41	55	52
66	39	36	43	39	63	61	62	43	41	28	45	42	55	53
67	39	37	43	39	64	63	63	43	41	28	45	43	56	54
68	40	38	43	40	64	64	65	44	42	28	46	43	56	56
69	40	39	44	41	65	66	67	44	42	29	46	44	57	57
70	40	40	44	42	66	67	68	44	43	29	46	45	58	58
71	41	41	44	43	66	69	70	44	43	29	47	46	58	60
72	41	42	44	43	67	71	72	44	44	29	47	46	59	61
73	41	44	44	44	67	72	74	44	44	29	47	47	59	62

TABLE 7

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 COMPREHENSION

RAW SCORE ITBS 12-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-Q	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	3	1	3	1	3	2	1	5	2	1	3	1	3	1
2	5	2	5	2	6	4	1	8	4	2	5	2	6	3
3	7	3	8	3	8	6	2	11	6	3	7	3	9	4
4	9	4	10	4	11	8	3	13	7	4	9	4	11	5
5	10	4	11	4	13	10	3	15	8	5	11	5	13	6
6	12	5	13	5	15	12	4	17	10	6	12	6	15	7
7	13	6	15	6	17	13	4	19	11	7	13	7	17	8
8	14	6	16	7	19	15	5	20	12	7	15	8	18	9
9	15	7	17	8	20	16	6	21	13	8	16	9	20	10
10	16	8	18	9	22	18	7	22	14	9	17	10	21	11
11	17	8	20	9	24	19	7	24	15	9	18	10	22	12
12	18	9	21	10	25	21	8	25	16	10	19	11	24	13
13	19	10	22	11	27	22	9	25	17	11	20	12	25	14
14	19	10	23	12	28	23	10	26	18	11	21	13	26	15
15	20	11	23	12	29	25	10	27	18	12	22	14	27	16
16	21	11	24	13	31	26	11	28	19	13	23	15	28	17
17	22	12	25	14	32	27	12	29	20	13	24	15	29	18
18	22	13	26	14	33	28	13	29	21	14	25	16	30	19
19	23	13	27	15	34	30	13	30	21	14	25	17	31	20
20	24	14	27	16	35	31	14	31	22	15	26	18	32	20
21	24	14	28	16	36	32	15	31	23	15	27	18	33	21
22	25	15	29	17	38	33	16	32	23	16	28	19	34	22
23	25	15	29	18	39	34	17	32	24	16	28	20	35	23
24	26	16	30	18	40	35	18	33	24	17	29	20	35	24
25	26	16	31	19	40	36	18	33	25	17	30	21	36	25
26	27	17	31	20	41	37	19	34	26	17	30	22	37	26
27	27	17	32	20	42	38	20	34	26	18	31	23	38	26
28	28	18	32	21	43	39	21	35	27	18	32	23	38	27
29	28	19	33	22	44	40	22	35	27	19	32	24	39	28
30	29	19	33	22	45	41	23	36	28	19	33	25	40	29
31	29	20	34	23	46	42	24	36	28	19	33	25	40	30
32	30	20	34	23	46	43	25	36	29	20	34	26	41	31
33	30	21	34	24	47	44	26	37	29	20	34	26	42	31
34	30	21	35	25	48	45	27	37	30	20	35	27	42	32
35	31	22	35	25	49	46	28	37	30	21	35	28	43	33
36	31	22	36	26	49	47	28	38	31	21	36	28	43	34
37	32	23	36	26	50	48	29	38	31	22	36	29	44	35
38	32	23	36	27	51	49	30	38	32	22	37	30	45	35
39	32	24	37	27	51	50	31	39	32	22	37	30	45	36
40	33	24	37	28	52	50	32	39	33	22	38	31	46	37

TABLE 7 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 COMPREHENSION

RAW SCORE ITBS 12-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	33	25	37	28	53	51	33	39	33	23	38	31	46	38
42	33	25	38	29	53	52	34	40	34	23	38	32	47	38
43	34	26	38	30	54	53	35	40	34	23	39	32	47	39
44	34	26	38	30	55	54	36	40	34	24	39	33	48	40
45	34	27	39	31	55	54	38	40	35	24	40	34	48	41
46	35	27	39	31	56	55	39	40	35	24	40	34	49	41
47	35	28	39	32	56	56	40	41	36	24	40	35	49	42
48	35	29	40	32	57	57	41	41	36	25	41	35	50	43
49	36	29	40	33	57	57	42	41	36	25	41	36	50	44
50	36	30	40	33	58	58	43	41	37	25	41	36	51	44
51	36	30	40	34	58	59	44	42	37	25	42	37	51	45
52	36	31	41	34	59	60	45	42	38	26	42	37	51	46
53	37	31	41	35	59	60	46	42	38	26	42	38	52	47
54	37	32	41	35	60	61	47	42	38	26	43	38	52	47
55	37	32	41	36	60	62	49	42	39	26	43	39	53	48
56	38	33	42	36	61	62	50	42	39	27	43	39	53	49
57	38	33	42	37	61	63	51	43	39	27	44	40	54	50
58	38	34	42	37	62	64	52	43	40	27	44	40	54	50
59	38	35	42	37	62	64	53	43	40	27	44	41	54	51
60	39	35	42	38	62	65	54	43	40	27	44	41	55	52
61	39	36	43	38	63	66	56	43	41	28	45	42	55	53
62	39	36	43	39	63	66	57	43	41	28	45	42	55	53
63	39	37	43	39	64	67	58	43	41	28	45	43	56	54
64	39	37	43	40	64	67	59	44	42	28	45	43	56	55
65	40	38	43	40	64	68	61	44	42	28	46	43	56	56
66	40	39	43	41	65	69	62	44	42	28	46	44	57	56
67	40	39	44	41	65	69	63	44	42	29	46	44	57	57
68	40	40	44	42	65	70	65	44	43	29	46	45	57	58
69	41	40	44	42	66	70	66	44	43	29	46	45	58	59
70	41	41	44	42	66	71	67	44	43	29	47	46	58	59
71	41	42	44	43	66	71	69	44	44	29	47	46	58	60
72	41	42	44	43	67	72	70	44	44	29	47	46	59	61
73	41	43	44	44	67	72	72	44	44	29	47	47	59	62
74	41	44	44	44	67	73	73	44	44	29	47	47	59	62
75	41	44	44	44	67	73	74	44	44	29	47	47	59	63

TABLE 8

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES													
MAT E-F	CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	2	1	1	1	1	1	1
3	2	1	2	1	2	1	1	3	1	1	2	1	2	1
4	2	1	2	1	2	2	1	4	2	1	2	1	3	1
5	3	1	3	1	3	2	1	5	2	1	3	1	3	1
6	4	1	4	1	4	3	1	6	3	2	4	1	4	2
7	4	2	4	2	5	3	2	7	3	2	4	2	5	2
8	5	2	5	2	6	4	2	8	4	2	5	2	6	2
9	5	2	6	2	6	5	2	9	4	2	6	2	7	3
10	6	3	7	2	7	5	3	10	5	3	6	3	8	3
11	7	3	8	3	8	6	3	11	6	3	7	3	9	4
12	8	3	8	3	9	7	3	12	6	4	8	4	10	4
13	8	4	9	4	10	8	4	13	7	4	9	4	11	5
14	9	4	10	4	11	9	4	14	8	4	10	4	12	5
15	10	4	11	4	13	10	5	15	8	5	10	5	13	6
16	11	5	12	5	14	10	5	16	9	5	11	5	14	6
17	12	5	13	5	15	11	6	17	10	6	12	6	15	7
18	12	6	14	6	16	13	7	18	10	6	13	7	16	8
19	13	6	15	6	17	14	7	19	11	7	14	7	17	8
20	14	7	16	7	19	15	8	20	12	7	15	8	18	9
21	15	7	17	8	20	16	9	21	13	8	16	9	19	10
22	16	8	18	8	22	17	10	22	14	9	17	9	21	11
23	16	8	19	9	23	19	11	23	14	9	18	10	22	12
24	17	9	20	10	24	20	11	24	15	10	19	11	23	13
25	18	9	21	10	26	21	13	25	16	10	20	12	24	14
26	19	10	22	11	27	23	14	26	17	11	21	13	26	15
27	20	11	23	12	29	24	15	27	18	12	22	14	27	16
28	21	11	24	13	31	26	16	28	19	13	23	15	28	17
29	22	12	25	14	32	28	17	29	20	13	24	16	30	18
30	23	13	27	15	34	29	19	30	21	14	25	17	31	19
31	24	14	28	16	36	31	20	31	22	15	27	18	32	21
32	25	15	29	17	38	33	22	32	23	16	28	19	34	22
33	26	16	30	18	40	35	24	33	25	17	29	21	35	24
34	27	17	31	20	41	37	26	34	26	17	30	22	37	26
35	28	18	32	21	43	40	28	35	27	18	32	23	39	28
36	29	19	33	23	45	42	31	36	28	19	33	25	40	30
37	30	21	35	24	48	45	34	37	30	20	35	27	42	32
38	31	22	36	26	50	47	37	38	31	21	36	29	44	34
39	33	24	37	28	52	50	40	39	33	22	38	31	46	37
40	34	26	38	30	54	53	44	40	34	24	39	33	48	40

TABLE 8 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F READING (COMPR.)

RAW SCORE MAT E-F	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	35	29	40	32	57	57	48	41	36	25	41	35	50	43
42	37	31	41	35	59	61	53	42	38	26	42	38	52	47
43	38	35	42	38	62	65	59	43	40	27	44	41	54	51
44	40	39	44	41	65	69	67	44	42	29	46	44	57	57

TABLE 9

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F READING (COMPR.)

RAW SCORE MAT I-F	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	2	1	1	1	2	1	1	3	1	1	1	1	2	1
2	3	1	3	1	3	2	1	5	2	1	3	1	3	1
3	4	2	4	1	4	3	2	7	3	2	4	2	5	2
4	5	2	6	2	6	4	2	8	4	2	5	2	6	3
5	6	3	7	2	7	6	3	10	5	3	7	3	8	3
6	8	3	8	3	9	7	3	12	6	3	8	3	9	4
7	9	4	10	4	11	8	4	13	7	4	9	4	11	5
8	10	4	11	4	12	9	5	15	8	5	10	5	12	6
9	11	5	12	5	14	11	5	16	9	5	11	5	14	6
10	12	5	14	6	16	12	6	17	10	6	12	6	15	7
11	13	6	15	6	17	13	7	19	11	7	14	7	17	8
12	14	7	16	7	19	15	8	20	12	7	15	8	18	9
13	15	7	17	8	20	16	9	21	13	8	16	9	20	10
14	16	8	18	9	22	18	10	22	14	9	17	10	21	11
15	17	8	20	9	24	19	11	24	15	10	18	11	23	12
16	18	9	21	10	26	21	12	25	16	10	19	11	24	13
17	19	10	22	11	27	22	13	26	17	11	21	12	25	14
18	20	11	23	12	29	24	15	27	18	12	22	13	27	16
19	21	11	24	13	31	26	16	28	19	12	23	14	28	17
20	22	12	25	14	32	27	17	29	20	13	24	15	29	18
21	23	13	26	15	34	29	19	30	21	14	25	17	31	19
22	24	14	27	16	35	31	20	31	22	15	26	18	32	21
23	25	15	28	17	37	33	22	32	23	15	27	19	33	22
24	25	15	29	18	39	34	23	33	24	16	29	20	35	23
25	26	16	30	19	40	36	25	33	24	17	30	21	36	25
26	27	17	31	20	42	38	27	34	25	18	31	22	37	26
27	28	18	32	21	44	40	28	35	26	18	32	23	39	28
28	29	19	33	22	45	42	30	36	27	19	33	25	40	29
29	30	20	34	23	47	43	32	37	28	20	34	26	41	31
30	31	21	35	25	48	45	34	37	29	21	35	27	42	32
31	31	22	36	26	50	47	36	38	30	21	36	29	44	34
32	32	23	37	27	51	49	38	39	31	22	37	30	45	36
33	33	25	37	28	53	51	41	39	32	23	38	31	46	37
34	34	26	38	30	54	53	43	40	33	23	39	32	47	39
35	35	27	39	31	55	55	45	40	34	24	40	34	48	41
36	35	29	40	32	57	57	48	41	35	25	41	35	50	43
37	36	30	40	33	58	59	51	41	36	25	42	37	51	45
38	37	31	41	35	59	61	53	42	37	26	42	38	52	47
39	38	33	42	36	61	62	56	42	38	27	43	39	53	49
40	38	35	42	38	62	64	59	43	39	27	44	41	54	51

TABLE 9 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES													
MAT I-F	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	39	36	43	39	63	66	62	43	40	28	45	42	55	54
42	40	38	43	40	64	68	65	44	41	28	46	44	57	56
43	40	40	44	42	66	70	69	44	43	29	46	45	58	58
44	41	42	44	43	67	72	72	44	44	29	47	46	59	61

TABLE 10

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

STEP II LEVEL 4 FORM A PART 2 (COMPR.)

RAW SCORE STEP 4-A	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-B	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	3	1	3	1	3	2	1	4	2	1	3	1	3	1
2	5	2	5	2	5	4	2	8	4	2	5	2	6	2
3	7	3	7	3	8	6	3	11	5	2	7	3	8	3
4	9	4	9	4	10	8	4	13	7	3	9	4	11	5
5	10	4	12	5	13	10	5	15	8	4	11	5	13	6
6	12	5	13	6	15	12	6	17	10	5	12	6	15	7
7	13	6	15	7	18	14	8	19	11	6	14	7	17	9
8	15	7	17	8	20	16	9	21	13	6	16	9	20	10
9	16	8	19	9	23	18	10	23	14	7	17	10	22	11
10	18	9	20	10	25	20	12	24	16	8	19	11	23	13
11	19	10	22	11	27	23	13	26	17	9	21	12	25	14
12	20	11	24	12	30	25	15	27	18	10	22	14	27	16
13	22	12	25	14	32	27	17	29	20	11	24	15	29	18
14	23	13	27	15	34	29	19	30	21	12	25	17	31	19
15	24	14	28	16	36	32	21	31	22	13	27	18	33	21
16	25	15	29	18	38	34	23	32	24	14	28	20	34	23
17	26	16	31	19	41	36	25	34	25	15	30	21	36	25
18	28	18	32	21	43	39	27	35	26	16	31	23	38	27
19	29	19	33	22	45	41	30	36	28	17	33	25	40	29
20	30	20	34	24	47	44	33	37	29	18	34	26	41	31
21	31	22	35	25	49	46	35	38	31	19	35	28	43	33
22	32	24	37	27	51	49	39	39	32	21	37	30	45	36
23	33	25	38	29	53	52	42	39	33	22	38	32	47	38
24	35	27	39	31	55	55	45	40	35	23	40	34	48	41
25	36	29	40	33	57	58	49	41	36	24	41	36	50	44
26	37	32	41	35	60	61	54	42	38	25	42	38	52	47
27	38	34	42	37	62	64	58	43	40	26	44	40	54	51
28	39	37	43	40	64	67	63	43	41	27	45	43	56	54
29	41	41	44	42	66	70	69	44	43	29	47	45	58	59

TABLE 11

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E READING (COMPR.)

RAW SCORE SRA BL-E	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
2	2	1	2	1	2	2	1	4	2	1	1	1	2	1
3	3	1	3	1	3	2	1	5	2	1	2	1	4	1
4	4	2	4	1	4	3	2	7	3	2	2	2	5	2
5	5	2	5	2	6	4	2	8	4	2	3	2	6	2
6	6	2	6	2	7	5	2	9	5	3	4	3	7	3
7	7	3	7	3	8	6	3	11	5	3	4	3	8	4
8	8	3	9	3	9	7	3	12	6	4	5	4	10	4
9	9	4	10	4	11	8	4	13	7	4	5	4	11	5
10	10	4	11	4	12	9	5	15	8	5	6	5	12	6
11	11	5	12	5	13	10	5	16	9	5	7	5	13	6
12	11	5	13	5	15	11	6	17	10	6	8	6	15	7
13	12	6	14	6	16	13	7	18	10	6	8	7	16	8
14	13	6	15	6	18	14	7	19	11	7	9	7	17	8
15	14	7	16	7	19	15	8	20	12	8	10	8	18	9
16	15	7	17	8	20	16	9	21	13	8	10	9	20	10
17	16	8	18	8	22	18	10	22	14	9	11	9	21	11
18	17	8	19	9	23	19	11	23	15	9	12	10	22	12
19	18	9	20	10	25	20	12	24	16	10	13	11	23	13
20	18	9	21	11	26	22	13	25	16	11	14	12	25	14
21	19	10	22	11	28	23	14	26	17	11	14	13	26	15
22	20	11	23	12	29	24	15	27	18	12	15	14	27	16
23	21	11	24	13	31	26	16	28	19	12	16	14	28	17
24	22	12	25	14	32	27	17	29	20	13	17	15	29	18
25	23	13	26	15	34	29	18	30	21	14	18	16	31	19
26	23	13	27	16	35	30	20	31	22	14	19	17	32	20
27	24	14	28	16	36	32	21	31	23	15	20	18	33	21
28	25	15	29	17	38	34	22	32	24	16	21	19	34	23
29	26	16	30	18	39	35	24	33	24	16	22	20	35	24
30	27	17	31	19	41	37	25	34	25	17	23	21	37	25
31	27	17	32	20	42	38	27	34	26	18	24	23	38	27
32	28	18	33	21	44	40	29	35	27	19	25	24	39	28
33	29	19	33	23	45	42	31	36	28	19	26	25	40	29
34	30	20	34	24	47	44	32	37	29	20	27	26	41	31
35	31	21	35	25	48	46	34	37	30	21	29	27	43	32
36	31	23	36	26	50	47	37	38	31	21	30	29	44	34
37	32	24	37	27	51	49	39	39	32	22	31	30	45	36
38	33	25	37	28	53	51	41	39	33	23	32	31	46	38
39	34	26	38	30	54	53	44	40	34	23	34	33	48	40
40	35	28	39	31	56	55	46	41	35	24	35	34	49	42

TABLE 11 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES												
SRA BL-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
41	36	29	40	33	57	57	49	41	36	25	37	36	50	44
42	36	31	41	34	59	60	52	42	38	26	38	37	51	46
43	37	32	41	36	60	62	55	42	39	26	39	39	53	48
44	38	34	42	37	62	64	59	43	40	27	41	41	54	51
45	39	37	43	39	63	66	62	43	41	28	43	42	56	54
46	40	39	43	41	65	69	66	44	42	28	44	44	57	57
47	41	42	44	43	66	71	71	44	44	29	46	46	58	60

TABLE 12

EQUATING TABLES FOR CONVERTING RAW SCORES CN A BASE TEST INTO EQUIVALENT SCORES CN ALL CTHER TESTS

SRA GREEN FORM E READING (CCMPR.)

RAW SCORE SRA CR-E	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
1	3	1	3	1	3	2	1	5	2	1	3	1	3	1
2	5	2	5	2	6	4	2	8	4	2	5	1	6	2
3	7	3	7	3	8	6	3	11	5	3	7	1	8	4
4	9	4	9	4	10	8	4	13	7	4	9	2	11	5
5	10	4	11	4	13	10	5	15	8	5	11	2	13	6
6	12	5	13	5	15	12	6	17	10	6	12	3	15	7
7	13	6	15	6	17	13	7	19	11	7	14	3	17	8
8	14	7	16	7	19	15	8	20	12	8	15	4	18	9
9	15	7	18	8	21	17	9	22	13	8	16	4	20	10
10	16	8	19	9	23	19	11	23	14	9	18	5	22	12
11	18	9	20	10	25	20	12	24	16	10	19	5	23	13
12	19	10	22	11	26	22	13	25	17	11	20	6	25	14
13	20	10	23	12	28	23	14	26	18	11	21	7	26	15
14	20	11	24	13	30	25	15	27	19	12	22	7	28	16
15	21	12	25	13	31	27	17	28	20	13	24	8	29	17
16	22	12	26	14	33	28	18	29	21	14	25	9	30	19
17	23	13	27	15	35	30	19	30	21	14	26	9	31	20
18	24	14	28	16	36	31	21	31	22	15	27	10	33	21
19	25	15	29	17	37	33	22	32	23	16	28	11	34	22
20	26	15	30	18	39	35	23	33	24	16	29	12	35	23
21	26	16	30	19	40	36	25	33	25	17	30	13	36	25
22	27	17	31	20	42	38	26	34	26	17	30	13	37	26
23	28	18	32	21	43	39	28	35	27	18	31	14	38	27
24	28	19	33	22	44	41	29	35	27	19	32	15	39	28
25	29	19	33	23	45	42	31	36	28	19	33	16	40	29
26	30	20	34	24	47	44	32	37	29	20	34	17	41	31
27	30	21	35	24	48	45	34	37	30	20	35	18	42	32
28	31	22	35	25	49	46	35	38	31	21	35	19	43	33
29	32	23	36	26	50	48	37	38	31	22	36	20	44	35
30	32	24	37	27	51	49	39	39	32	22	37	21	45	36
31	33	25	37	28	52	51	40	39	33	23	38	23	46	37
32	34	25	38	29	53	52	42	40	34	23	38	24	47	39
33	34	26	38	30	55	54	44	40	34	24	39	25	48	40
34	35	27	39	31	56	55	46	40	35	24	40	26	49	41
35	35	28	39	32	57	56	48	41	36	25	41	27	50	43
36	36	29	40	33	58	58	50	41	37	25	41	29	50	44
37	36	30	40	34	59	59	51	42	37	26	42	30	51	46
38	37	31	41	35	59	61	53	42	38	26	42	31	52	47
39	37	33	41	36	60	62	55	42	39	26	43	33	53	49
40	38	34	42	37	61	63	57	43	39	27	44	34	54	50

TABLE 12 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES													
SRA CR-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-Q	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
41	38	35	42	38	62	65	60	43	40	27	44	36	55	52
42	39	36	43	39	63	66	62	43	41	28	45	37	55	53
43	39	37	43	40	64	67	64	44	42	28	45	39	56	55
44	40	39	43	41	65	69	66	44	42	28	46	41	57	57
45	40	40	44	42	66	70	69	44	43	29	46	42	58	58
46	41	42	44	43	66	71	71	44	44	29	47	44	58	60
47	41	43	44	44	67	73	73	44	44	29	47	46	59	62

TABLE 13

EQUATING TABLES FOR CONVERTING RAW SCORES CN A BASE TEST INTC EQUIVALENT SCORES CN ALL CTHER TESTS

SAT INTERMECIATE I FORM W PARAGRAPH MEANING

RAW SCORE	EQUIVALENT SCORES												
SAT I-W	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT 1-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-X	SAT II-W
1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
2	2	1	2	1	2	1	1	3	1	1	2	1	2	1
3	3	1	3	1	3	2	1	4	2	1	3	1	3	1
4	3	1	4	1	4	3	1	6	3	1	3	1	4	2
5	4	2	4	2	5	3	2	7	3	2	4	2	5	2
6	5	2	5	2	6	4	2	8	4	2	5	2	6	2
7	6	2	6	2	7	5	2	9	4	3	6	2	7	3
8	7	3	7	3	8	6	3	10	5	3	7	3	8	3
9	7	3	8	3	9	6	3	11	6	3	7	3	9	4
10	8	3	9	3	10	7	4	12	6	4	8	4	10	4
11	9	4	10	4	11	8	4	13	7	4	9	4	11	5
12	10	4	11	4	12	9	5	14	8	5	10	5	12	5
13	10	4	11	5	13	10	5	15	8	5	11	5	13	6
14	11	5	12	5	14	11	6	16	9	5	11	6	14	7
15	12	5	13	5	15	12	6	17	10	6	12	6	15	7
16	12	6	14	6	16	13	7	18	10	6	13	7	16	8
17	13	6	15	6	17	14	7	19	11	7	14	7	17	8
18	14	6	16	7	19	15	8	20	12	7	15	8	18	9
19	15	7	17	7	20	16	9	21	13	8	15	8	18	10
20	15	7	18	8	21	17	9	22	13	8	16	9	19	10
21	16	8	18	9	22	18	10	22	14	9	17	10	20	11
22	17	8	19	9	23	19	11	23	15	9	18	10	21	12
23	17	9	20	10	24	20	11	24	15	10	19	11	22	13
24	18	9	21	10	26	21	12	25	16	10	20	11	23	13
25	19	10	22	11	27	22	13	26	17	11	20	12	24	14
26	19	10	23	12	28	23	14	26	17	11	21	13	25	15
27	20	11	23	12	29	24	15	27	18	12	22	14	26	16
28	21	11	24	13	30	26	16	28	19	12	23	14	27	17
29	22	12	25	14	32	27	17	29	20	13	24	15	28	18
30	22	12	26	14	33	28	18	29	20	13	25	16	29	19
31	23	13	27	15	34	29	19	30	21	14	25	17	30	19
32	24	14	27	16	35	31	20	31	22	15	26	18	31	20
33	24	14	28	17	37	32	21	31	23	15	27	18	32	21
34	25	15	29	17	38	33	22	32	23	16	28	19	33	22
35	26	16	30	18	39	35	24	33	24	16	29	20	34	24
36	26	16	30	19	40	36	25	33	25	17	30	21	35	25
37	27	17	31	20	42	37	26	34	26	17	30	22	35	26
38	28	18	32	21	43	39	28	35	27	18	31	23	36	27
39	28	18	33	22	44	40	29	35	27	19	32	24	37	28
40	29	19	33	22	45	42	30	36	28	19	33	25	38	29

TABLE 13 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE I FORM W PARAGRAPH MEANING

RAW SCORE	EQUIVALENT SCORES													
SAT I-W	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-X	SAT II-W
41	30	20	34	23	46	43	32	36	29	20	34	26	39	30
42	30	21	35	24	48	45	34	37	30	20	35	27	40	32
43	31	22	35	25	49	46	35	38	30	21	35	28	41	33
44	32	23	36	26	50	48	37	38	31	21	36	29	42	34
45	32	24	37	27	51	49	39	39	32	22	37	30	43	36
46	33	25	37	28	52	51	41	39	33	23	38	31	44	37
47	34	26	38	29	54	52	42	40	34	23	39	32	45	39
48	34	27	39	30	55	54	44	40	35	24	39	33	46	40
49	35	28	39	31	56	56	47	41	35	24	40	34	48	42
50	36	29	40	32	57	57	49	41	36	25	41	36	49	43
51	36	30	40	34	58	59	51	42	37	25	42	37	50	45
52	37	31	41	35	59	60	53	42	38	26	42	38	51	47
53	37	33	41	36	61	62	56	42	39	26	43	39	52	49
54	38	34	42	37	62	64	58	43	40	27	44	40	53	51
55	39	36	43	38	63	65	61	43	41	27	45	42	54	53
56	39	37	43	40	64	67	64	44	41	28	45	43	55	55
57	40	39	43	41	65	69	66	44	42	28	46	44	56	57
58	41	41	44	42	66	71	69	44	43	29	47	45	58	59
59	41	43	44	44	67	72	73	44	44	29	47	47	59	61

TABLE 14

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W PARAGRAPH MEANING

RAW SCORE SAT II-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-Q	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
1	2	1	2	1	2	2	1	4	2	1	2	1	3	1
2	4	2	5	2	5	3	2	7	3	2	4	2	5	2
3	6	2	6	2	7	5	3	10	5	3	6	3	7	3
4	8	3	8	3	9	7	3	12	6	3	8	3	9	4
5	9	4	10	4	11	8	4	14	7	4	9	4	11	6
6	10	4	12	5	13	10	5	15	9	5	11	5	13	7
7	12	5	13	5	15	12	6	17	10	6	12	6	15	8
8	13	6	15	6	17	13	7	18	11	7	13	7	16	9
9	14	6	16	7	19	15	8	20	12	7	15	8	18	10
10	15	7	17	8	20	16	9	21	13	8	16	9	19	11
11	16	8	18	8	22	18	10	22	14	9	17	9	21	12
12	17	8	19	9	24	19	11	23	15	9	18	10	22	13
13	18	9	21	10	25	21	12	24	16	10	19	11	24	14
14	19	10	22	11	27	22	13	25	17	11	20	12	25	15
15	19	10	23	12	28	23	14	26	18	11	21	13	26	16
16	20	11	24	12	29	25	15	27	18	12	22	14	27	17
17	21	11	24	13	31	26	16	28	19	13	23	15	28	18
18	22	12	25	14	32	27	17	29	20	13	24	15	29	19
19	23	13	26	15	34	29	18	30	21	14	25	16	31	20
20	23	13	27	15	35	30	19	30	22	14	26	17	32	21
21	24	14	28	16	36	31	21	31	22	15	27	18	33	22
22	25	15	29	17	37	33	22	32	23	16	28	19	34	23
23	25	15	29	18	38	34	23	32	24	16	28	20	35	24
24	26	16	30	18	40	35	24	33	25	17	29	21	35	25
25	27	17	31	19	41	37	25	34	25	17	30	21	36	26
26	27	17	31	20	42	38	26	34	26	18	31	22	37	27
27	28	18	32	21	43	39	28	35	27	18	31	23	38	28
28	28	18	33	21	44	40	29	35	27	19	32	24	39	29
29	29	19	33	22	45	41	30	36	28	19	33	25	40	30
30	29	20	34	23	46	43	31	36	29	20	33	25	41	31
31	30	20	34	24	47	44	33	37	29	20	34	26	41	32
32	30	21	35	24	48	45	34	37	30	20	35	27	42	33
33	31	22	35	25	49	46	35	38	30	21	35	28	43	33
34	31	22	36	26	50	47	36	38	31	21	36	29	44	34
35	32	23	36	27	51	48	38	38	32	22	36	29	44	35
36	32	24	37	27	51	49	39	39	32	22	37	30	45	36
37	33	24	37	28	52	51	40	39	33	23	38	31	46	37
38	33	25	38	29	53	52	41	39	33	23	38	32	46	38
39	34	26	38	29	54	53	43	40	34	23	39	32	47	39
40	34	26	38	30	55	54	44	40	34	24	39	33	48	40

TABLE 14 (CONTINUED)

EQUATING TABLES FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W PARAGRAPH MEANING

RAW SCORE SAT II-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
41	35	27	39	31	55	55	45	40	35	24	40	34	48	41
42	35	28	39	31	56	56	47	41	36	24	40	35	49	42
43	35	29	40	32	57	57	48	41	36	25	41	35	50	43
44	36	29	40	33	57	58	49	41	37	25	41	36	50	44
45	36	30	40	33	58	59	51	41	37	25	42	37	51	45
46	36	31	41	34	59	60	52	42	38	26	42	37	51	46
47	37	31	41	35	59	61	53	42	38	26	42	38	52	47
48	37	32	41	35	60	61	55	42	38	26	43	39	53	48
49	38	33	42	36	61	62	56	42	39	27	43	39	53	49
50	38	34	42	37	61	63	57	43	39	27	44	40	54	50
51	38	34	42	37	62	64	59	43	40	27	44	41	54	51
52	39	35	42	38	62	65	60	43	40	27	44	41	55	52
53	39	36	43	39	63	66	61	43	41	28	45	42	55	53
54	39	37	43	39	63	67	63	43	41	28	45	42	56	54
55	40	38	43	40	64	67	64	44	42	28	45	43	56	55
56	40	38	43	40	64	68	65	44	42	28	46	44	57	56
57	40	39	44	41	65	69	67	44	42	29	46	44	57	57
58	40	40	44	42	65	70	68	44	43	29	46	45	58	58
59	41	41	44	42	66	71	69	44	43	29	47	45	58	59
60	41	42	44	43	66	71	71	44	44	29	47	46	58	60
61	41	42	44	43	67	72	72	44	44	29	47	46	59	61
62	41	43	44	44	67	73	73	44	44	29	47	47	59	62
63	41	44	44	44	67	73	75	44	44	29	47	47	59	63

Appendix E

Assignment Errors - Vocabulary

TABLE 1

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 3 FORM A VOCABULARY

RAW SCORE	EQUIVALENT SCORES														
	CAT 3-A	CAT 3-B	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.284	1.270	0.136	1.420	0.493	0.879	1.316	0.078	0.087	0.077	0.197	0.938	0.363	1.009	
2	0.290	0.514	0.135	0.664	0.263	0.123	0.560	0.005	0.080	0.061	0.180	0.182	0.358	0.253	
3	0.172	0.047	0.135	0.197	0.002	0.344	0.093	0.077	0.073	0.041	0.163	0.285	0.109	0.214	
4	0.047	0.304	0.139	0.154	0.097	0.030	0.258	0.035	0.064	0.022	0.145	0.105	0.004	0.183	
5	0.026	0.163	0.097	0.306	0.139	0.182	0.182	0.021	0.054	0.001	0.128	0.181	0.064	0.103	
6	0.076	0.083	0.062	0.060	0.107	0.064	0.064	0.021	0.043	0.024	0.110	0.026	0.102	0.112	
7	0.113	0.162	0.034	0.159	0.061	0.038	0.156	0.032	0.030	0.049	0.091	0.143	0.117	0.107	
8	0.074	0.036	0.010	0.101	0.035	0.097	0.042	0.054	0.017	0.077	0.072	0.055	0.072	0.037	
9	0.028	0.126	0.010	0.082	0.021	0.086	0.096	0.022	0.004	0.106	0.054	0.033	0.039	0.131	
10	0.010	0.045	0.028	0.087	0.014	0.040	0.075	0.017	0.010	0.064	0.035	0.093	0.013	0.040	
11	0.042	0.073	0.045	0.075	0.014	0.013	0.021	0.041	0.025	0.022	0.017	0.069	0.006	0.034	
12	0.069	0.081	0.060	0.047	0.016	0.002	0.085	0.011	0.040	0.021	0.001	0.021	0.023	0.089	
13	0.069	0.010	0.057	0.101	0.022	0.009	0.063	0.034	0.056	0.066	0.020	0.014	0.037	0.059	
14	0.040	0.078	0.041	0.009	0.030	0.008	0.017	0.030	0.049	0.078	0.039	0.037	0.048	0.016	
15	0.015	0.061	0.027	0.060	0.039	0.002	0.014	0.003	0.028	0.027	0.057	0.053	0.059	0.017	
16	0.007	0.066	0.015	0.076	0.050	0.007	0.034	0.032	0.007	0.025	0.039	0.063	0.069	0.040	
17	0.027	0.038	0.005	0.022	0.059	0.020	0.044	0.054	0.014	0.081	0.019	0.068	0.064	0.056	
18	0.044	0.071	0.005	0.019	0.044	0.036	0.047	0.035	0.036	0.051	0.001	0.064	0.053	0.065	
19	0.058	0.059	0.013	0.050	0.031	0.054	0.044	0.021	0.048	0.008	0.020	0.062	0.043	0.065	
20	0.063	0.032	0.019	0.072	0.018	0.031	0.037	0.012	0.024	0.071	0.039	0.058	0.034	0.059	
21	0.051	0.013	0.025	0.058	0.003	0.005	0.023	0.006	0.001	0.059	0.052	0.048	0.026	0.060	
22	0.041	0.002	0.028	0.043	0.009	0.021	0.006	0.006	0.026	0.007	0.034	0.036	0.018	0.056	
23	0.033	0.011	0.030	0.035	0.022	0.049	0.014	0.011	0.051	0.017	0.020	0.010	0.010	0.043	
24	0.029	0.016	0.030	0.034	0.033	0.022	0.039	0.022	0.024	0.054	0.001	0.002	0.002	0.026	
25	0.026	0.016	0.028	0.039	0.045	0.010	0.034	0.039	0.006	0.018	0.015	0.020	0.004	0.005	
26	0.027	0.011	0.024	0.049	0.055	0.044	0.0	0.064	0.037	0.097	0.031	0.044	0.011	0.021	
27	0.030	0.002	0.018	0.056	0.065	0.024	0.039	0.076	0.037	0.043	0.047	0.039	0.016	0.052	
28	0.038	0.013	0.009	0.032	0.069	0.013	0.017	0.046	0.002	0.037	0.061	0.007	0.022	0.020	
29	0.048	0.033	0.004	0.002	0.071	0.053	0.033	0.005	0.037	0.113	0.066	0.030	0.026	0.023	
30	0.064	0.060	0.022	0.036	0.076	0.021	0.013	0.050	0.037	0.091	0.061	0.046	0.029	0.034	
31	0.059	0.035	0.045	0.037	0.087	0.024	0.051	0.117	0.010	0.059	0.057	0.0	0.029	0.024	
32	0.037	0.009	0.077	0.020	0.091	0.063	0.016	0.054	0.063	0.119	0.058	0.054	0.028	0.018	
33	0.007	0.067	0.117	0.036	0.088	0.015	0.012	0.035	0.010	0.030	0.062	0.016	0.022	0.051	
34	0.034	0.001	0.093	0.048	0.077	0.041	0.037	0.170	0.060	0.077	0.074	0.055	0.011	0.046	
35	0.090	0.060	0.056	0.016	0.054	0.084	0.057	0.072	0.017	0.165	0.098	0.016	0.009	0.042	
36	0.043	0.062	0.005	0.003	0.009	0.023	0.070	0.113	0.086	0.065	0.145	0.089	0.042	0.060	
37	0.054	0.061	0.117	0.002	0.088	0.063	0.071	0.236	0.006	0.084	0.204	0.016	0.101	0.044	
38	0.122	0.117	0.351	0.037	0.353	0.203	0.045	0.052	0.127	0.384	0.224	0.110	0.215	0.061	
39	0.153	0.004	0.359	0.196	0.405	0.221	0.080	0.706	0.181	0.358	0.247	0.202	0.255	0.085	

TABLE 2

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 4 FORM A VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
CAT 4-A	CAT 3-A	CAT 4-B	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.047	0.064	0.165	0.150	0.045	0.334	0.046	0.043	0.026	0.088	0.116	0.332	0.156	0.261
2	0.083	0.085	0.066	0.143	0.024	0.019	0.019	0.017	0.109	0.107	0.035	0.109	0.099	0.195
3	0.036	0.104	0.046	0.137	0.001	0.124	0.006	0.019	0.053	0.113	0.071	0.019	0.036	0.073
4	0.045	0.141	0.117	0.132	0.031	0.005	0.030	0.042	0.035	0.019	0.072	0.093	0.032	0.005
5	0.073	0.137	0.021	0.128	0.065	0.083	0.052	0.011	0.041	0.095	0.056	0.060	0.067	0.039
6	0.010	0.088	0.047	0.111	0.032	0.001	0.073	0.044	0.061	0.056	0.030	0.004	0.027	0.069
7	0.061	0.046	0.037	0.087	0.022	0.063	0.075	0.048	0.029	0.034	0.004	0.041	0.030	0.078
8	0.008	0.012	0.021	0.070	0.044	0.001	0.040	0.026	0.013	0.021	0.045	0.069	0.071	0.046
9	0.038	0.016	0.033	0.060	0.021	0.058	0.006	0.016	0.052	0.043	0.019	0.030	0.041	0.018
10	0.059	0.042	0.046	0.052	0.027	0.005	0.024	0.036	0.001	0.067	0.039	0.003	0.016	0.006
11	0.032	0.064	0.013	0.047	0.050	0.043	0.053	0.044	0.049	0.089	0.007	0.032	0.002	0.027
12	0.013	0.072	0.012	0.045	0.016	0.018	0.036	0.019	0.012	0.046	0.046	0.059	0.013	0.047
13	0.002	0.047	0.030	0.045	0.011	0.023	0.004	0.004	0.028	0.005	0.032	0.034	0.020	0.054
14	0.011	0.023	0.041	0.046	0.033	0.041	0.025	0.0	0.040	0.066	0.006	0.009	0.021	0.032
15	0.016	0.002	0.046	0.050	0.049	0.006	0.049	0.006	0.008	0.070	0.015	0.014	0.018	0.010
16	0.016	0.018	0.044	0.055	0.061	0.026	0.018	0.023	0.022	0.002	0.031	0.036	0.012	0.011
17	0.011	0.036	0.035	0.060	0.064	0.048	0.011	0.053	0.048	0.086	0.042	0.055	0.0	0.032
18	0.002	0.054	0.020	0.054	0.067	0.022	0.041	0.078	0.035	0.045	0.049	0.037	0.014	0.054
19	0.013	0.062	0.004	0.045	0.061	0.0	0.030	0.033	0.015	0.050	0.048	0.020	0.035	0.033
20	0.033	0.046	0.037	0.035	0.048	0.020	0.0	0.028	0.004	0.080	0.043	0.003	0.059	0.010
21	0.060	0.030	0.082	0.024	0.026	0.037	0.029	0.102	0.020	0.029	0.031	0.011	0.071	0.013
22	0.070	0.016	0.048	0.014	0.006	0.049	0.046	0.020	0.033	0.101	0.009	0.024	0.041	0.036
23	0.035	0.063	0.010	0.002	0.052	0.059	0.019	0.085	0.045	0.024	0.022	0.035	0.006	0.050
24	0.009	0.008	0.086	0.011	0.082	0.064	0.007	0.045	0.054	0.110	0.067	0.045	0.037	0.027
25	0.067	0.017	0.050	0.023	0.021	0.064	0.034	0.102	0.059	0.037	0.069	0.051	0.089	0.003
26	0.072	0.024	0.049	0.036	0.065	0.057	0.057	0.037	0.062	0.102	0.010	0.056	0.050	0.021
27	0.001	0.030	0.094	0.049	0.078	0.042	0.036	0.169	0.061	0.076	0.073	0.056	0.010	0.047
28	0.093	0.033	0.037	0.063	0.039	0.016	0.016	0.021	0.056	0.072	0.075	0.053	0.084	0.051
29	0.060	0.033	0.116	0.070	0.114	0.024	0.003	0.132	0.043	0.158	0.038	0.044	0.069	0.027
30	0.062	0.030	0.067	0.065	0.053	0.085	0.021	0.175	0.024	0.003	0.123	0.027	0.020	0.002
31	0.107	0.022	0.102	0.063	0.116	0.084	0.037	0.006	0.008	0.172	0.038	0.001	0.141	0.025
32	0.061	0.008	0.178	0.063	0.149	0.002	0.052	0.175	0.055	0.145	0.143	0.045	0.040	0.056
33	0.135	0.013	0.018	0.068	0.047	0.130	0.064	0.371	0.127	0.051	0.109	0.114	0.118	0.082
34	0.117	0.047	0.234	0.080	0.263	0.086	0.074	0.169	0.089	0.267	0.107	0.102	0.098	0.056
35	0.125	0.096	0.274	0.106	0.228	0.119	0.080	0.073	0.002	0.275	0.349	0.015	0.131	0.025
36	0.350	0.045	0.009	0.154	0.055	0.164	0.082	0.356	0.169	0.008	0.103	0.148	0.152	0.018
37	0.004	0.048	0.355	0.192	0.401	0.225	0.076	0.702	0.177	0.354	0.243	0.198	0.259	0.081
38	0.459	0.128	0.818	0.206	0.864	0.238	0.061	1.165	0.097	0.817	0.706	0.072	0.204	0.196
39	1.208	0.149	1.567	0.220	1.613	0.587	0.032	1.914	0.652	1.566	1.455	0.677	0.953	0.282

TABLE 3

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 2 FORM Q VOCABULARY

RAW SCORE CTBS 2-C	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-R	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.136	1.406	0.501	1.556	0.629	1.015	1.452	0.058	0.223	0.059	0.333	1.074	0.499	1.145
2	0.135	0.649	0.279	0.799	0.128	0.258	0.695	0.091	0.215	0.074	0.315	0.317	0.258	0.388
3	0.135	0.182	0.004	0.332	0.137	0.209	0.228	0.058	0.208	0.094	0.152	0.150	0.026	0.079
4	0.139	0.165	0.105	0.015	0.210	0.169	0.119	0.033	0.139	0.117	0.049	0.244	0.143	0.322
5	0.143	0.306	0.165	0.257	0.046	0.113	0.325	0.033	0.079	0.144	0.002	0.038	0.139	0.040
6	0.097	0.066	0.078	0.209	0.042	0.085	0.085	0.045	0.043	0.056	0.031	0.175	0.033	0.200
7	0.062	0.145	0.009	0.002	0.096	0.126	0.126	0.041	0.019	0.038	0.048	0.036	0.040	0.050
8	0.034	0.128	0.041	0.193	0.095	0.004	0.122	0.002	0.004	0.015	0.057	0.109	0.092	0.141
9	0.010	0.046	0.078	0.091	0.045	0.087	0.052	0.044	0.007	0.067	0.062	0.065	0.082	0.027
10	0.010	0.136	0.082	0.072	0.011	0.076	0.106	0.012	0.014	0.096	0.064	0.043	0.029	0.136
11	0.028	0.017	0.042	0.115	0.014	0.012	0.047	0.045	0.018	0.036	0.063	0.110	0.015	0.012
12	0.045	0.118	0.010	0.030	0.031	0.032	0.066	0.004	0.020	0.023	0.062	0.024	0.051	0.079
13	0.060	0.021	0.018	0.107	0.044	0.062	0.073	0.032	0.020	0.081	0.059	0.039	0.083	0.060
14	0.073	0.083	0.040	0.028	0.051	0.073	0.010	0.035	0.017	0.054	0.053	0.087	0.052	0.014
15	0.057	0.047	0.060	0.078	0.057	0.048	0.070	0.013	0.014	0.009	0.048	0.043	0.020	0.071
16	0.041	0.037	0.063	0.050	0.059	0.033	0.058	0.011	0.008	0.071	0.041	0.004	0.007	0.057
17	0.027	0.088	0.044	0.033	0.059	0.025	0.013	0.030	0.001	0.054	0.033	0.026	0.032	0.010
18	0.015	0.021	0.027	0.091	0.057	0.022	0.019	0.047	0.008	0.010	0.024	0.048	0.054	0.025
19	0.005	0.033	0.013	0.027	0.054	0.025	0.039	0.045	0.019	0.076	0.014	0.063	0.069	0.051
20	0.005	0.076	0.001	0.024	0.049	0.031	0.052	0.040	0.031	0.046	0.004	0.059	0.048	0.070
21	0.013	0.046	0.009	0.063	0.044	0.041	0.057	0.034	0.045	0.021	0.007	0.049	0.030	0.052
22	0.019	0.013	0.017	0.060	0.037	0.050	0.056	0.031	0.043	0.090	0.020	0.045	0.015	0.040
23	0.025	0.012	0.023	0.033	0.028	0.030	0.048	0.031	0.024	0.034	0.034	0.047	0.001	0.035
24	0.028	0.030	0.027	0.015	0.019	0.007	0.034	0.034	0.002	0.035	0.049	0.053	0.010	0.037
25	0.030	0.041	0.029	0.005	0.008	0.019	0.016	0.041	0.023	0.093	0.047	0.050	0.020	0.044
26	0.030	0.046	0.029	0.004	0.003	0.049	0.009	0.052	0.050	0.024	0.031	0.032	0.028	0.056
27	0.028	0.044	0.027	0.011	0.017	0.018	0.041	0.067	0.022	0.046	0.013	0.008	0.032	0.033
28	0.024	0.035	0.022	0.025	0.031	0.020	0.024	0.073	0.013	0.094	0.007	0.020	0.035	0.003
29	0.018	0.020	0.014	0.047	0.047	0.042	0.021	0.058	0.053	0.025	0.029	0.055	0.034	0.034
30	0.009	0.004	0.002	0.041	0.065	0.004	0.026	0.037	0.011	0.046	0.052	0.016	0.031	0.029
31	0.004	0.037	0.015	0.002	0.067	0.056	0.037	0.009	0.041	0.117	0.062	0.034	0.022	0.027
32	0.022	0.048	0.038	0.058	0.054	0.001	0.009	0.028	0.015	0.053	0.039	0.024	0.007	0.012
33	0.045	0.010	0.070	0.008	0.042	0.060	0.009	0.079	0.055	0.014	0.012	0.045	0.016	0.040
34	0.077	0.050	0.048	0.027	0.029	0.014	0.016	0.131	0.009	0.087	0.019	0.001	0.049	0.053
35	0.093	0.049	0.003	0.045	0.016	0.052	0.008	0.086	0.033	0.151	0.059	0.038	0.099	0.047
36	0.056	0.037	0.078	0.040	0.002	0.053	0.021	0.016	0.073	0.109	0.112	0.072	0.047	0.014
37	0.005	0.067	0.041	0.002	0.014	0.018	0.065	0.108	0.091	0.070	0.140	0.094	0.047	0.065
38	0.117	0.018	0.126	0.086	0.029	0.148	0.046	0.353	0.123	0.033	0.127	0.132	0.136	0.073
39	0.359	0.009	0.054	0.163	0.046	0.155	0.073	0.347	0.178	0.001	0.112	0.157	0.143	0.009

TABLE 4

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 3 FORM Q VOCABULARY

RAW SCORE CTBS 3-Q	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-R	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.154	0.156	0.015	0.130	0.195	0.184	0.104	0.048	0.124	0.132	0.034	0.259	0.158	0.337
2	0.060	0.143	0.002	0.130	0.098	0.124	0.124	0.035	0.017	0.036	0.050	0.034	0.042	0.052
3	0.082	0.137	0.072	0.131	0.061	0.004	0.143	0.047	0.084	0.024	0.029	0.115	0.043	0.064
4	0.075	0.132	0.030	0.133	0.061	0.062	0.096	0.034	0.050	0.053	0.052	0.006	0.081	0.109
5	0.047	0.111	0.028	0.136	0.063	0.045	0.038	0.036	0.045	0.026	0.048	0.068	0.024	0.042
6	0.009	0.087	0.050	0.096	0.021	0.017	0.008	0.035	0.058	0.069	0.030	0.046	0.057	0.007
7	0.060	0.070	0.033	0.064	0.026	0.058	0.046	0.044	0.032	0.087	0.0	0.007	0.001	0.043
8	0.022	0.060	0.027	0.039	0.039	0.002	0.066	0.035	0.008	0.086	0.041	0.048	0.042	0.071
9	0.019	0.052	0.024	0.020	0.025	0.055	0.028	0.016	0.053	0.070	0.020	0.049	0.068	0.046
10	0.050	0.047	0.060	0.004	0.019	0.004	0.006	0.025	0.002	0.042	0.040	0.015	0.045	0.020
11	0.058	0.045	0.033	0.011	0.054	0.041	0.035	0.060	0.048	0.001	0.001	0.014	0.032	0.002
12	0.043	0.045	0.015	0.022	0.034	0.022	0.049	0.045	0.017	0.050	0.034	0.038	0.025	0.022
13	0.035	0.046	0.005	0.033	0.013	0.014	0.021	0.046	0.018	0.088	0.052	0.055	0.025	0.039
14	0.034	0.050	0.004	0.043	0.001	0.045	0.005	0.056	0.046	0.020	0.035	0.036	0.032	0.054
15	0.039	0.055	0.011	0.050	0.006	0.029	0.030	0.073	0.033	0.057	0.024	0.019	0.043	0.044
16	0.049	0.060	0.025	0.058	0.006	0.005	0.049	0.048	0.012	0.069	0.018	0.005	0.060	0.028
17	0.065	0.064	0.047	0.061	0.0	0.016	0.026	0.011	0.006	0.022	0.018	0.008	0.064	0.013
18	0.056	0.054	0.074	0.053	0.014	0.032	0.005	0.042	0.019	0.099	0.027	0.017	0.040	0.0
19	0.032	0.045	0.041	0.045	0.037	0.045	0.015	0.078	0.030	0.005	0.042	0.025	0.010	0.012
20	0.002	0.035	0.002	0.039	0.069	0.055	0.035	0.007	0.039	0.115	0.064	0.032	0.024	0.025
21	0.036	0.024	0.058	0.035	0.050	0.057	0.049	0.086	0.044	0.005	0.055	0.035	0.065	0.037
22	0.083	0.014	0.062	0.031	0.008	0.059	0.032	0.034	0.047	0.115	0.023	0.038	0.055	0.050
23	0.037	0.002	0.008	0.028	0.050	0.061	0.017	0.087	0.047	0.022	0.020	0.037	0.008	0.048
24	0.020	0.011	0.097	0.027	0.071	0.053	0.004	0.034	0.043	0.099	0.078	0.034	0.048	0.038
25	0.090	0.023	0.027	0.027	0.002	0.041	0.011	0.125	0.036	0.060	0.046	0.028	0.076	0.026
26	0.036	0.036	0.085	0.029	0.101	0.021	0.024	0.001	0.026	0.066	0.026	0.020	0.014	0.015
27	0.048	0.049	0.045	0.032	0.029	0.007	0.037	0.131	0.012	0.125	0.104	0.007	0.059	0.002
28	0.086	0.063	0.100	0.037	0.102	0.047	0.049	0.084	0.007	0.009	0.012	0.010	0.075	0.011
29	0.016	0.076	0.040	0.044	0.038	0.093	0.061	0.056	0.033	0.149	0.114	0.032	0.007	0.026
30	0.130	0.070	0.158	0.054	0.144	0.046	0.070	0.202	0.067	0.088	0.032	0.064	0.111	0.043
31	0.003	0.065	0.002	0.067	0.012	0.020	0.067	0.110	0.089	0.068	0.142	0.092	0.045	0.063
32	0.170	0.063	0.165	0.071	0.179	0.116	0.066	0.057	0.055	0.235	0.025	0.062	0.078	0.062
33	0.002	0.063	0.115	0.059	0.086	0.065	0.069	0.238	0.008	0.082	0.206	0.018	0.103	0.042
34	0.203	0.068	0.086	0.041	0.115	0.062	0.074	0.317	0.059	0.119	0.041	0.046	0.050	0.014
35	0.037	0.080	0.314	0.017	0.343	0.166	0.082	0.089	0.164	0.347	0.187	0.147	0.178	0.024
36	0.231	0.106	0.168	0.021	0.122	0.013	0.095	0.179	0.104	0.169	0.280	0.121	0.025	0.081
37	0.196	0.154	0.163	0.083	0.209	0.318	0.116	0.510	0.015	0.162	0.051	0.006	0.306	0.111
38	0.253	0.206	0.612	0.198	0.658	0.032	0.145	0.959	0.303	0.611	0.500	0.278	0.002	0.010
39	0.988	0.220	1.347	0.252	1.393	0.767	0.188	1.694	0.432	1.346	1.235	0.457	0.733	0.256

TABLE 5

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 10 FORM 5 VOCABULARY

RAW SCORE ITBS 10-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-6	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.263	0.777	0.128	0.927	0.188	0.386	0.823	0.037	0.343	0.202	0.296	0.445	0.130	0.516
2	0.002	0.045	0.137	0.195	0.180	0.346	0.091	0.079	0.071	0.043	0.161	0.287	0.111	0.216
3	0.097	0.352	0.046	0.251	0.173	0.067	0.355	0.058	0.033	0.119	0.048	0.008	0.093	0.086
4	0.107	0.624	0.042	0.167	0.163	0.043	0.043	0.007	0.085	0.121	0.011	0.133	0.075	0.219
5	0.061	0.223	0.095	0.098	0.107	0.095	0.217	0.020	0.091	0.110	0.048	0.132	0.056	0.046
6	0.035	0.061	0.045	0.136	0.075	0.125	0.007	0.020	0.052	0.112	0.072	0.020	0.037	0.072
7	0.021	0.147	0.011	0.061	0.056	0.065	0.117	0.001	0.025	0.085	0.075	0.054	0.018	0.125
8	0.014	0.031	0.014	0.101	0.045	0.026	0.061	0.031	0.004	0.050	0.049	0.107	0.001	0.026
9	0.014	0.087	0.031	0.061	0.038	0.001	0.035	0.027	0.011	0.008	0.031	0.055	0.020	0.048
10	0.016	0.065	0.044	0.063	0.036	0.018	0.101	0.027	0.024	0.037	0.015	0.005	0.039	0.104
11	0.022	0.032	0.051	0.079	0.035	0.031	0.041	0.012	0.034	0.088	0.002	0.036	0.059	0.037
12	0.030	0.104	0.057	0.021	0.036	0.038	0.013	0.044	0.043	0.048	0.009	0.067	0.077	0.014
13	0.039	0.022	0.059	0.099	0.039	0.041	0.053	0.036	0.051	0.012	0.018	0.063	0.052	0.056
14	0.050	0.044	0.059	0.026	0.042	0.043	0.072	0.018	0.057	0.075	0.026	0.033	0.027	0.069
15	0.061	0.078	0.057	0.039	0.048	0.041	0.038	0.004	0.047	0.047	0.033	0.009	0.003	0.032
16	0.059	0.021	0.054	0.081	0.053	0.037	0.015	0.005	0.037	0.022	0.040	0.009	0.020	0.003
17	0.044	0.027	0.049	0.025	0.058	0.032	0.003	0.009	0.028	0.054	0.045	0.024	0.043	0.021
18	0.031	0.066	0.044	0.019	0.051	0.023	0.013	0.010	0.017	0.023	0.051	0.034	0.064	0.039
19	0.018	0.056	0.037	0.054	0.044	0.013	0.019	0.006	0.006	0.053	0.053	0.040	0.052	0.052
20	0.003	0.016	0.028	0.061	0.035	0.002	0.020	0.003	0.004	0.062	0.049	0.045	0.029	0.061
21	0.009	0.011	0.019	0.034	0.028	0.012	0.015	0.015	0.017	0.016	0.043	0.045	0.009	0.056
22	0.022	0.033	0.008	0.013	0.020	0.027	0.008	0.033	0.031	0.059	0.039	0.042	0.012	0.052
23	0.033	0.049	0.003	0.001	0.014	0.046	0.006	0.055	0.047	0.021	0.034	0.035	0.031	0.055
24	0.045	0.061	0.017	0.006	0.006	0.035	0.024	0.067	0.039	0.063	0.030	0.025	0.049	0.050
25	0.055	0.065	0.031	0.006	0.0	0.011	0.047	0.042	0.018	0.063	0.024	0.011	0.066	0.034
26	0.065	0.064	0.047	0.0	0.007	0.016	0.026	0.011	0.006	0.022	0.018	0.008	0.064	0.013
27	0.070	0.061	0.065	0.014	0.014	0.046	0.009	0.028	0.033	0.111	0.013	0.031	0.054	0.014
28	0.069	0.048	0.078	0.037	0.020	0.028	0.048	0.076	0.044	0.022	0.005	0.051	0.047	0.049
29	0.071	0.026	0.067	0.050	0.026	0.011	0.003	0.076	0.006	0.055	0.005	0.015	0.045	0.013
30	0.076	0.006	0.054	0.008	0.033	0.055	0.040	0.026	0.039	0.107	0.015	0.030	0.047	0.042
31	0.087	0.052	0.042	0.050	0.039	0.018	0.033	0.037	0.028	0.028	0.030	0.037	0.058	0.002
32	0.088	0.021	0.029	0.002	0.046	0.043	0.013	0.123	0.038	0.058	0.048	0.030	0.078	0.024
33	0.077	0.065	0.016	0.029	0.051	0.036	0.008	0.102	0.017	0.154	0.075	0.022	0.088	0.031
34	0.054	0.039	0.002	0.038	0.057	0.055	0.023	0.018	0.071	0.111	0.114	0.070	0.045	0.012
35	0.009	0.053	0.014	0.012	0.064	0.032	0.074	0.122	0.077	0.056	0.154	0.080	0.033	0.051
36	0.088	0.047	0.029	0.086	0.069	0.151	0.017	0.324	0.094	0.004	0.156	0.104	0.165	0.044
37	0.353	0.055	0.046	0.122	0.075	0.109	0.027	0.301	0.224	0.047	0.158	0.203	0.097	0.037

TABLE 6

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 VOCABULARY

RAW SCORE ITBS 11-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-6	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.123	0.391	0.209	0.541	0.346	0.241	0.437	0.085	0.043	0.184	0.057	0.059	0.235	0.130
2	0.030	0.334	0.113	0.184	0.067	0.241	0.288	0.009	0.034	0.052	0.115	0.075	0.026	0.153
3	0.064	0.019	0.085	0.124	0.043	0.196	0.0	0.036	0.107	0.088	0.054	0.090	0.118	0.176
4	0.038	0.124	0.004	0.197	0.099	0.079	0.118	0.006	0.008	0.011	0.053	0.105	0.088	0.145
5	0.086	0.133	0.076	0.004	0.065	0.014	0.139	0.043	0.080	0.020	0.025	0.119	0.047	0.060
6	0.040	0.005	0.012	0.127	0.026	0.026	0.035	0.047	0.030	0.024	0.075	0.098	0.027	0.0
7	0.013	0.086	0.032	0.062	0.001	0.054	0.034	0.028	0.012	0.009	0.030	0.056	0.019	0.047
8	0.002	0.083	0.062	0.045	0.018	0.074	0.083	0.009	0.042	0.019	0.003	0.023	0.021	0.087
9	0.009	0.061	0.048	0.110	0.031	0.080	0.072	0.043	0.062	0.057	0.029	0.005	0.028	0.068
10	0.008	0.070	0.033	0.017	0.038	0.054	0.025	0.022	0.041	0.086	0.047	0.029	0.040	0.024
11	0.002	0.063	0.025	0.058	0.041	0.032	0.012	0.005	0.026	0.029	0.058	0.051	0.057	0.015
12	0.007	0.001	0.022	0.069	0.043	0.015	0.041	0.025	0.014	0.032	0.046	0.070	0.070	0.047
13	0.020	0.058	0.025	0.002	0.041	0.003	0.064	0.037	0.006	0.088	0.039	0.050	0.044	0.073
14	0.036	0.058	0.031	0.055	0.037	0.009	0.052	0.042	0.0	0.015	0.035	0.028	0.017	0.040
15	0.054	0.005	0.041	0.057	0.032	0.017	0.029	0.041	0.004	0.062	0.034	0.008	0.011	0.011
16	0.054	0.043	0.056	0.004	0.023	0.025	0.010	0.033	0.006	0.046	0.036	0.011	0.041	0.016
17	0.031	0.063	0.050	0.041	0.013	0.031	0.006	0.015	0.007	0.040	0.040	0.027	0.065	0.039
18	0.005	0.018	0.030	0.063	0.002	0.035	0.018	0.001	0.006	0.064	0.047	0.043	0.031	0.059
19	0.021	0.023	0.007	0.022	0.012	0.038	0.027	0.027	0.005	0.028	0.055	0.057	0.003	0.044
20	0.049	0.060	0.019	0.014	0.027	0.041	0.035	0.060	0.004	0.074	0.047	0.045	0.039	0.025
21	0.052	0.041	0.049	0.045	0.046	0.043	0.040	0.041	0.001	0.025	0.035	0.032	0.062	0.009
22	0.022	0.006	0.052	0.056	0.055	0.044	0.043	0.0	0.002	0.076	0.021	0.020	0.024	0.004
23	0.010	0.026	0.018	0.029	0.035	0.044	0.044	0.049	0.004	0.028	0.005	0.010	0.014	0.015
24	0.044	0.055	0.020	0.005	0.011	0.043	0.044	0.053	0.007	0.074	0.013	0.0	0.055	0.023
25	0.059	0.048	0.063	0.016	0.016	0.042	0.042	0.005	0.010	0.038	0.034	0.008	0.048	0.029
26	0.024	0.022	0.042	0.032	0.046	0.040	0.037	0.074	0.013	0.067	0.059	0.015	0.008	0.032
27	0.013	0.0	0.004	0.045	0.061	0.036	0.030	0.033	0.015	0.050	0.048	0.020	0.035	0.033
28	0.053	0.020	0.057	0.055	0.028	0.032	0.020	0.048	0.016	0.060	0.023	0.023	0.075	0.030
29	0.060	0.037	0.056	0.058	0.011	0.027	0.008	0.065	0.017	0.066	0.006	0.026	0.034	0.024
30	0.021	0.049	0.001	0.057	0.055	0.020	0.008	0.029	0.016	0.052	0.040	0.025	0.008	0.013
31	0.024	0.059	0.069	0.059	0.067	0.012	0.027	0.093	0.014	0.083	0.081	0.024	0.053	0.0
32	0.073	0.064	0.060	0.053	0.018	0.003	0.051	0.019	0.010	0.046	0.048	0.019	0.076	0.020
33	0.063	0.064	0.014	0.041	0.043	0.010	0.030	0.117	0.005	0.101	0.005	0.013	0.035	0.045
34	0.015	0.057	0.106	0.021	0.103	0.025	0.003	0.020	0.005	0.045	0.047	0.001	0.007	0.036
35	0.041	0.042	0.052	0.007	0.036	0.045	0.044	0.138	0.019	0.118	0.111	0.014	0.052	0.005
36	0.109	0.016	0.053	0.047	0.055	0.070	0.032	0.037	0.040	0.056	0.059	0.037	0.100	0.058
37	0.084	0.024	0.140	0.046	0.138	0.072	0.027	0.156	0.067	0.134	0.014	0.068	0.093	0.003
38	0.023	0.084	0.018	0.020	0.032	0.046	0.047	0.090	0.092	0.088	0.122	0.085	0.065	0.059
39	0.063	0.002	0.180	0.065	0.151	0.010	0.050	0.173	0.057	0.147	0.141	0.047	0.038	0.054
40	0.203	0.086	0.148	0.062	0.177	0.050	0.012	0.255	0.003	0.181	0.021	0.016	0.012	0.048

TABLE 6 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 VOCABULARY

RAW SCORE ITBS 11-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-6	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.244	0.119	0.155	0.013	0.109	0.161	0.082	0.192	0.117	0.156	0.267	0.134	0.012	0.094
42	0.221	0.225	0.580	0.032	0.626	0.294	0.177	0.927	0.335	0.579	0.468	0.310	0.034	0.042

TABLE 7

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 VOCABULARY

RAW SCORE ITBS 12-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.053	0.046	0.119	0.104	0.091	0.288	0.023	0.003	0.020	0.134	0.070	0.363	0.202	0.307
2	0.064	0.019	0.085	0.124	0.043	0.0	0.025	0.036	0.107	0.088	0.054	0.090	0.118	0.176
3	0.042	0.006	0.052	0.143	0.007	0.118	0.027	0.013	0.059	0.107	0.065	0.013	0.030	0.079
4	0.075	0.030	0.047	0.162	0.061	0.035	0.029	0.012	0.065	0.011	0.042	0.063	0.062	0.035
5	0.021	0.052	0.066	0.096	0.035	0.034	0.032	0.041	0.046	0.043	0.004	0.090	0.015	0.013
6	0.063	0.073	0.010	0.038	0.041	0.072	0.034	0.029	0.007	0.064	0.043	0.077	0.062	0.004
7	0.017	0.095	0.058	0.008	0.013	0.025	0.037	0.047	0.056	0.061	0.022	0.054	0.065	0.001
8	0.014	0.075	0.013	0.046	0.053	0.012	0.039	0.017	0.014	0.041	0.046	0.039	0.045	0.003
9	0.034	0.040	0.019	0.077	0.038	0.041	0.042	0.042	0.027	0.009	0.005	0.029	0.035	0.006
10	0.044	0.006	0.039	0.066	0.015	0.052	0.044	0.010	0.052	0.037	0.025	0.024	0.035	0.012
11	0.047	0.024	0.052	0.028	0.003	0.029	0.048	0.012	0.025	0.051	0.048	0.021	0.040	0.018
12	0.044	0.053	0.057	0.006	0.013	0.010	0.050	0.023	0.004	0.036	0.046	0.021	0.051	0.026
13	0.037	0.069	0.056	0.035	0.019	0.006	0.054	0.025	0.013	0.034	0.034	0.021	0.067	0.033
14	0.023	0.036	0.048	0.063	0.026	0.018	0.057	0.017	0.024	0.082	0.029	0.025	0.049	0.041
15	0.006	0.004	0.034	0.049	0.015	0.027	0.052	0.0	0.032	0.001	0.028	0.030	0.024	0.050
16	0.014	0.025	0.016	0.021	0.008	0.035	0.046	0.025	0.039	0.091	0.031	0.034	0.004	0.057
17	0.039	0.055	0.009	0.005	0.006	0.040	0.039	0.061	0.041	0.015	0.040	0.041	0.037	0.049
18	0.065	0.049	0.041	0.030	0.024	0.043	0.034	0.043	0.041	0.087	0.054	0.049	0.067	0.039
19	0.034	0.018	0.062	0.053	0.047	0.044	0.029	0.005	0.040	0.016	0.049	0.054	0.030	0.029
20	0.0	0.011	0.024	0.049	0.055	0.044	0.023	0.064	0.037	0.097	0.031	0.044	0.011	0.021
21	0.039	0.041	0.021	0.026	0.026	0.042	0.018	0.037	0.032	0.004	0.008	0.034	0.055	0.013
22	0.061	0.059	0.074	0.005	0.009	0.037	0.013	0.037	0.024	0.104	0.022	0.022	0.045	0.005
23	0.017	0.030	0.026	0.015	0.052	0.030	0.008	0.063	0.015	0.020	0.057	0.010	0.005	0.003
24	0.033	0.0	0.037	0.035	0.048	0.020	0.004	0.028	0.004	0.080	0.043	0.003	0.059	0.010
25	0.068	0.029	0.064	0.053	0.003	0.008	0.0	0.073	0.009	0.058	0.002	0.018	0.042	0.016
26	0.013	0.057	0.009	0.049	0.063	0.008	0.004	0.037	0.024	0.044	0.048	0.033	0.016	0.021
27	0.051	0.046	0.094	0.032	0.040	0.027	0.008	0.066	0.041	0.110	0.055	0.051	0.080	0.027
28	0.054	0.019	0.009	0.017	0.033	0.051	0.012	0.070	0.061	0.005	0.003	0.054	0.025	0.031
29	0.016	0.007	0.093	0.004	0.075	0.057	0.016	0.038	0.047	0.103	0.074	0.038	0.044	0.034
30	0.093	0.034	0.016	0.011	0.013	0.030	0.020	0.136	0.025	0.071	0.035	0.017	0.065	0.037
31	0.012	0.060	0.109	0.024	0.100	0.003	0.023	0.023	0.002	0.042	0.050	0.004	0.010	0.039
32	0.085	0.057	0.008	0.037	0.008	0.044	0.026	0.094	0.025	0.159	0.067	0.030	0.096	0.039
33	0.037	0.036	0.130	0.049	0.114	0.078	0.029	0.133	0.056	0.040	0.037	0.059	0.026	0.038
34	0.077	0.016	0.021	0.061	0.023	0.032	0.032	0.005	0.072	0.088	0.091	0.069	0.068	0.035
35	0.057	0.003	0.113	0.073	0.111	0.027	0.035	0.129	0.040	0.161	0.041	0.041	0.066	0.030
36	0.083	0.021	0.088	0.070	0.074	0.106	0.036	0.196	0.003	0.018	0.102	0.006	0.041	0.023
37	0.070	0.037	0.065	0.067	0.079	0.047	0.037	0.043	0.045	0.135	0.075	0.038	0.112	0.012
38	0.113	0.052	0.230	0.066	0.201	0.050	0.036	0.123	0.107	0.197	0.091	0.097	0.012	0.004
39	0.071	0.064	0.046	0.069	0.017	0.134	0.033	0.307	0.077	0.013	0.173	0.087	0.172	0.027
40	0.191	0.074	0.160	0.074	0.189	0.012	0.028	0.243	0.015	0.193	0.033	0.028	0.024	0.060

TABLE 7 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 VOCABULARY

RAW SCORE ITBS 12-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.045	0.080	0.354	0.082	0.308	0.199	0.017	0.007	0.082	0.355	0.269	0.065	0.211	0.105
42	0.326	0.082	0.073	0.095	0.027	0.082	0.003	0.274	0.199	0.074	0.185	0.216	0.070	0.064
43	0.080	0.076	0.279	0.116	0.325	0.301	0.043	0.626	0.101	0.278	0.167	0.122	0.335	0.005
44	0.398	0.001	0.757	0.145	0.803	0.177	0.136	1.104	0.158	0.756	0.645	0.133	0.143	0.135
45	1.176	0.032	1.535	0.188	1.581	0.955	0.377	1.882	0.620	1.534	1.423	0.645	0.921	0.314

TABLE 8

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F WORD KNOWLEDGE

RAW SCORE	EQUIVALENT SCORES													
MAT E-F	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	1.273	2.543	1.137	2.693	1.766	2.152	2.589	0.304	1.360	1.196	1.470	2.211	1.636	2.282
2	0.532	1.862	0.356	1.952	1.025	1.411	1.848	0.282	0.619	0.455	0.729	1.470	0.895	1.541
3	0.678	1.348	0.058	1.498	0.571	0.957	1.394	0.193	0.165	0.001	0.275	1.016	0.441	1.087
4	0.258	1.012	0.363	1.162	0.235	0.621	1.058	0.094	0.171	0.335	0.061	0.680	0.105	0.751
5	0.226	0.740	0.091	0.890	0.057	0.349	0.786	0.048	0.306	0.165	0.333	0.408	0.167	0.479
6	0.005	0.509	0.140	0.655	0.268	0.118	0.555	0.023	0.075	0.066	0.175	0.177	0.353	0.248
7	0.208	0.306	0.124	0.456	0.261	0.085	0.352	0.010	0.128	0.218	0.028	0.026	0.150	0.045
8	0.077	0.124	0.058	0.274	0.079	0.267	0.170	0.003	0.150	0.036	0.210	0.208	0.032	0.137
9	0.090	0.043	0.122	0.107	0.088	0.291	0.003	0.001	0.017	0.131	0.073	0.366	0.199	0.304
10	0.106	0.198	0.033	0.048	0.203	0.136	0.152	0.0	0.170	0.084	0.082	0.211	0.110	0.289
11	0.039	0.343	0.104	0.193	0.058	0.009	0.297	0.001	0.025	0.061	0.106	0.066	0.035	0.144
12	0.110	0.273	0.033	0.330	0.079	0.146	0.292	0.002	0.112	0.111	0.031	0.071	0.172	0.007
13	0.021	0.142	0.076	0.285	0.118	0.161	0.161	0.004	0.033	0.020	0.107	0.202	0.043	0.124
14	0.100	0.017	0.049	0.160	0.007	0.036	0.036	0.006	0.092	0.124	0.018	0.126	0.082	0.212
15	0.021	0.104	0.041	0.039	0.128	0.085	0.085	0.006	0.022	0.003	0.089	0.005	0.081	0.091
16	0.081	0.221	0.076	0.078	0.020	0.119	0.202	0.010	0.095	0.114	0.028	0.112	0.036	0.026
17	0.032	0.130	0.002	0.191	0.093	0.006	0.124	0.012	0.002	0.017	0.059	0.111	0.094	0.139
18	0.055	0.019	0.065	0.196	0.020	0.105	0.013	0.015	0.072	0.094	0.052	0.0	0.017	0.092
19	0.054	0.090	0.044	0.047	0.089	0.043	0.096	0.018	0.037	0.023	0.018	0.109	0.090	0.017
20	0.022	0.148	0.012	0.060	0.001	0.064	0.118	0.019	0.026	0.084	0.076	0.055	0.017	0.124
21	0.084	0.042	0.059	0.166	0.073	0.047	0.012	0.022	0.077	0.023	0.030	0.051	0.074	0.047
22	0.017	0.062	0.045	0.070	0.031	0.057	0.092	0.023	0.027	0.081	0.018	0.076	0.030	0.057
23	0.041	0.114	0.004	0.034	0.027	0.028	0.062	0.026	0.016	0.019	0.058	0.028	0.047	0.075
24	0.062	0.011	0.032	0.137	0.076	0.075	0.041	0.027	0.052	0.084	0.045	0.071	0.056	0.028
25	0.011	0.092	0.064	0.036	0.027	0.009	0.074	0.029	0.051	0.010	0.012	0.032	0.012	0.078
26	0.034	0.044	0.039	0.067	0.012	0.043	0.029	0.032	0.022	0.093	0.014	0.048	0.071	0.025
27	0.070	0.060	0.013	0.065	0.044	0.061	0.057	0.034	0.001	0.004	0.035	0.056	0.033	0.058
28	0.030	0.048	0.011	0.039	0.060	0.022	0.047	0.035	0.019	0.082	0.052	0.007	0.018	0.046
29	0.003	0.058	0.030	0.063	0.036	0.005	0.017	0.038	0.031	0.024	0.054	0.056	0.062	0.020
30	0.032	0.026	0.047	0.044	0.018	0.025	0.066	0.039	0.039	0.057	0.044	0.051	0.045	0.072
31	0.057	0.082	0.061	0.035	0.004	0.037	0.042	0.042	0.043	0.051	0.037	0.013	0.007	0.036
32	0.054	0.016	0.049	0.076	0.005	0.042	0.010	0.045	0.042	0.027	0.035	0.014	0.025	0.002
33	0.035	0.036	0.040	0.016	0.009	0.041	0.012	0.047	0.037	0.086	0.036	0.033	0.052	0.030
34	0.021	0.076	0.034	0.029	0.010	0.033	0.023	0.050	0.027	0.013	0.041	0.044	0.064	0.049
35	0.012	0.044	0.031	0.060	0.006	0.019	0.025	0.054	0.012	0.059	0.051	0.046	0.046	0.058
36	0.006	0.019	0.031	0.064	0.003	0.001	0.017	0.056	0.007	0.065	0.046	0.042	0.032	0.058
37	0.006	0.004	0.034	0.049	0.015	0.027	0.0	0.063	0.032	0.001	0.028	0.030	0.024	0.050
38	0.011	0.0	0.041	0.046	0.033	0.041	0.025	0.067	0.040	0.066	0.006	0.009	0.021	0.032
39	0.022	0.006	0.052	0.056	0.055	0.0	0.043	0.067	0.002	0.076	0.021	0.020	0.024	0.004
40	0.039	0.023	0.067	0.048	0.042	0.049	0.005	0.068	0.045	0.021	0.054	0.053	0.035	0.034

TABLE 8 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F WORD KNOWLEDGE

RAW SCORE	EQUIVALENT SCORES													
MAT E-F	CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.064	0.053	0.058	0.011	0.011	0.005	0.037	0.069	0.005	0.023	0.029	0.003	0.053	0.024
42	0.046	0.033	0.037	0.042	0.028	0.033	0.037	0.070	0.048	0.083	0.015	0.053	0.068	0.042
43	0.005	0.028	0.009	0.007	0.076	0.048	0.028	0.071	0.022	0.108	0.071	0.025	0.031	0.018
44	0.050	0.020	0.028	0.034	0.026	0.029	0.037	0.072	0.013	0.081	0.011	0.004	0.021	0.016
45	0.054	0.045	0.079	0.034	0.037	0.019	0.038	0.073	0.009	0.065	0.067	0.0	0.082	0.039
46	0.035	0.037	0.086	0.001	0.102	0.020	0.023	0.074	0.025	0.065	0.027	0.019	0.013	0.016
47	0.072	0.021	0.016	0.056	0.018	0.037	0.005	0.076	0.077	0.093	0.096	0.074	0.063	0.030
48	0.113	0.006	0.108	0.057	0.122	0.090	0.043	0.078	0.002	0.178	0.032	0.005	0.135	0.031
49	0.052	0.073	0.347	0.089	0.301	0.192	0.007	0.078	0.075	0.348	0.276	0.058	0.204	0.098

TABLE 9

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F WORD KNOWLEDGE

RAW SCORE	EQUIVALENT SCORES														
MAT I-F	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.087	1.183	0.223	1.333	0.406	0.792	1.229	0.165	0.094	0.164	0.110	0.851	0.276	0.922
2	0.080	0.434	0.215	0.584	0.343	0.043	0.480	0.075	0.092	0.141	0.100	0.102	0.278	0.173
3	0.073	0.026	0.159	0.124	0.071	0.308	0.020	0.017	0.090	0.114	0.090	0.358	0.182	0.287
4	0.064	0.368	0.079	0.218	0.033	0.034	0.322	0.025	0.087	0.086	0.081	0.041	0.060	0.119
5	0.054	0.109	0.043	0.252	0.085	0.128	0.128	0.033	0.083	0.053	0.074	0.218	0.010	0.157
6	0.043	0.126	0.019	0.017	0.115	0.107	0.107	0.022	0.080	0.019	0.067	0.017	0.059	0.069
7	0.030	0.132	0.004	0.189	0.091	0.008	0.126	0.002	0.076	0.019	0.061	0.113	0.096	0.137
8	0.017	0.053	0.007	0.084	0.052	0.080	0.059	0.037	0.072	0.060	0.055	0.072	0.089	0.020
9	0.004	0.122	0.014	0.086	0.025	0.090	0.092	0.026	0.070	0.103	0.050	0.029	0.043	0.127
10	0.010	0.035	0.018	0.097	0.004	0.030	0.065	0.027	0.066	0.054	0.045	0.103	0.003	0.030
11	0.025	0.098	0.020	0.050	0.011	0.012	0.046	0.016	0.063	0.003	0.042	0.044	0.031	0.059
12	0.040	0.041	0.020	0.087	0.024	0.042	0.093	0.051	0.061	0.061	0.039	0.019	0.063	0.080
13	0.056	0.066	0.017	0.045	0.034	0.065	0.007	0.022	0.058	0.071	0.036	0.070	0.069	0.003
14	0.071	0.061	0.014	0.064	0.043	0.062	0.056	0.001	0.056	0.005	0.034	0.057	0.034	0.057
15	0.049	0.029	0.008	0.058	0.051	0.041	0.066	0.015	0.054	0.063	0.033	0.012	0.001	0.065
16	0.028	0.089	0.001	0.032	0.058	0.026	0.014	0.031	0.052	0.055	0.032	0.025	0.031	0.011
17	0.007	0.013	0.008	0.083	0.057	0.014	0.027	0.035	0.051	0.018	0.032	0.056	0.062	0.033
18	0.014	0.052	0.019	0.008	0.047	0.006	0.058	0.043	0.050	0.054	0.033	0.056	0.050	0.070
19	0.036	0.058	0.031	0.055	0.037	0.0	0.052	0.042	0.048	0.015	0.035	0.028	0.017	0.040
20	0.058	0.001	0.045	0.053	0.028	0.004	0.025	0.037	0.047	0.066	0.038	0.004	0.015	0.007
21	0.048	0.049	0.061	0.002	0.017	0.006	0.004	0.027	0.046	0.040	0.042	0.017	0.047	0.022
22	0.024	0.056	0.043	0.048	0.006	0.007	0.013	0.012	0.045	0.047	0.047	0.034	0.058	0.046
23	0.001	0.012	0.024	0.057	0.004	0.006	0.024	0.007	0.044	0.058	0.053	0.049	0.025	0.059
24	0.026	0.028	0.002	0.017	0.017	0.005	0.032	0.032	0.043	0.033	0.051	0.055	0.008	0.039
25	0.053	0.064	0.023	0.018	0.031	0.004	0.039	0.064	0.042	0.070	0.043	0.041	0.043	0.021
26	0.051	0.040	0.050	0.046	0.047	0.001	0.041	0.040	0.041	0.026	0.034	0.031	0.061	0.008
27	0.024	0.008	0.054	0.058	0.057	0.002	0.041	0.002	0.040	0.078	0.023	0.022	0.026	0.002
28	0.006	0.022	0.022	0.033	0.039	0.004	0.040	0.045	0.039	0.024	0.009	0.014	0.010	0.011
29	0.037	0.048	0.013	0.012	0.018	0.007	0.037	0.060	0.037	0.081	0.006	0.007	0.048	0.016
30	0.069	0.058	0.053	0.006	0.006	0.010	0.032	0.005	0.035	0.028	0.024	0.002	0.058	0.019
31	0.037	0.035	0.055	0.019	0.033	0.013	0.024	0.061	0.034	0.080	0.046	0.002	0.021	0.019
32	0.002	0.015	0.011	0.030	0.007	0.015	0.015	0.048	0.031	0.035	0.063	0.005	0.020	0.018
33	0.037	0.004	0.041	0.039	0.044	0.016	0.004	0.032	0.028	0.076	0.039	0.007	0.063	0.014
34	0.077	0.020	0.073	0.044	0.006	0.017	0.009	0.082	0.025	0.049	0.011	0.009	0.051	0.007
35	0.037	0.033	0.015	0.047	0.039	0.016	0.024	0.013	0.021	0.068	0.024	0.009	0.008	0.003
36	0.010	0.045	0.055	0.047	0.081	0.014	0.041	0.107	0.016	0.065	0.067	0.010	0.039	0.014
37	0.063	0.054	0.070	0.043	0.028	0.010	0.047	0.009	0.011	0.056	0.058	0.009	0.086	0.030
38	0.068	0.059	0.009	0.036	0.038	0.005	0.025	0.122	0.007	0.096	0.010	0.008	0.040	0.050
39	0.010	0.082	0.111	0.026	0.098	0.005	0.002	0.025	0.0	0.040	0.052	0.006	0.012	0.041
40	0.060	0.061	0.033	0.012	0.017	0.019	0.025	0.119	0.007	0.137	0.092	0.005	0.071	0.014

TABLE 9 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F WORD KNOWLEDGE

RAW SCORE MAT I-F	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.093	0.056	0.093	0.007	0.095	0.040	0.056	0.077	0.016	0.016	0.019	0.003	0.082	0.018
42	0.017	0.043	0.073	0.033	0.071	0.067	0.040	0.089	0.024	0.182	0.081	0.001	0.026	0.059
43	0.086	0.024	0.091	0.067	0.077	0.109	0.003	0.199	0.035	0.021	0.099	0.003	0.044	0.026
44	0.115	0.008	0.110	0.055	0.124	0.092	0.045	0.002	0.046	0.180	0.030	0.007	0.133	0.033
45	0.006	0.055	0.123	0.008	0.094	0.057	0.077	0.230	0.060	0.090	0.198	0.010	0.095	0.050
46	0.266	0.089	0.145	0.059	0.174	0.003	0.015	0.258	0.075	0.178	0.018	0.013	0.009	0.045
47	0.127	0.002	0.272	0.104	0.226	0.117	0.082	0.075	0.092	0.273	0.351	0.017	0.129	0.023
48	0.181	0.169	0.178	0.015	0.224	0.333	0.101	0.525	0.112	0.177	0.066	0.021	0.321	0.096
49	0.556	0.097	0.915	0.303	0.961	0.335	0.158	1.262	0.135	0.914	0.803	0.025	0.301	0.176

TABLE 10

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

STEP II LEVEL 4 FORM A PART 1 (VOCAB.)

RAW SCORE STEP 4-A	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-B	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.077	1.347	0.059	1.497	0.570	0.556	1.393	0.001	0.164	0.395	0.274	1.015	0.440	1.086
2	0.061	0.575	0.074	0.725	0.202	0.184	0.621	0.066	0.141	0.365	0.241	0.243	0.332	0.314
3	0.041	0.088	0.094	0.238	0.043	0.303	0.134	0.036	0.114	0.149	0.204	0.244	0.068	0.173
4	0.022	0.282	0.117	0.132	0.119	0.052	0.236	0.061	0.086	0.059	0.166	0.127	0.026	0.205
5	0.001	0.162	0.096	0.305	0.138	0.181	0.181	0.020	0.053	0.023	0.127	0.182	0.063	0.104
6	0.024	0.107	0.038	0.036	0.131	0.088	0.088	0.003	0.019	0.008	0.086	0.002	0.078	0.088
7	0.049	0.113	0.015	0.208	0.110	0.011	0.187	0.017	0.019	0.006	0.042	0.094	0.077	0.156
8	0.077	0.113	0.067	0.024	0.085	0.020	0.119	0.023	0.060	0.010	0.005	0.132	0.067	0.040
9	0.064	0.019	0.036	0.151	0.050	0.024	0.011	0.023	0.054	0.017	0.053	0.074	0.051	0.024
10	0.022	0.095	0.023	0.093	0.008	0.009	0.043	0.019	0.003	0.027	0.039	0.047	0.028	0.056
11	0.021	0.102	0.054	0.026	0.037	0.019	0.064	0.010	0.061	0.038	0.022	0.042	0.002	0.068
12	0.066	0.056	0.009	0.069	0.048	0.057	0.061	0.004	0.005	0.051	0.039	0.052	0.029	0.062
13	0.027	0.034	0.054	0.087	0.012	0.029	0.041	0.024	0.055	0.063	0.030	0.075	0.064	0.044
14	0.025	0.031	0.010	0.086	0.047	0.032	0.009	0.051	0.018	0.075	0.014	0.038	0.044	0.015
15	0.051	0.043	0.046	0.070	0.022	0.015	0.037	0.027	0.015	0.089	0.050	0.013	0.002	0.025
16	0.008	0.067	0.021	0.042	0.023	0.046	0.036	0.013	0.040	0.089	0.028	0.057	0.051	0.062
17	0.059	0.046	0.034	0.001	0.053	0.040	0.034	0.055	0.047	0.079	0.0	0.013	0.033	0.001
18	0.007	0.005	0.035	0.050	0.016	0.028	0.001	0.001	0.033	0.071	0.027	0.029	0.025	0.049
19	0.054	0.066	0.024	0.020	0.021	0.025	0.015	0.066	0.026	0.065	0.055	0.056	0.052	0.034
20	0.018	0.002	0.046	0.057	0.063	0.028	0.016	0.021	0.024	0.060	0.033	0.038	0.014	0.013
21	0.043	0.045	0.025	0.022	0.022	0.038	0.004	0.033	0.028	0.058	0.004	0.030	0.059	0.009
22	0.037	0.050	0.046	0.005	0.032	0.050	0.020	0.083	0.035	0.056	0.037	0.030	0.015	0.017
23	0.031	0.029	0.053	0.005	0.055	0.052	0.044	0.081	0.049	0.057	0.060	0.040	0.060	0.042
24	0.059	0.024	0.014	0.022	0.028	0.046	0.005	0.065	0.056	0.058	0.002	0.059	0.030	0.026
25	0.030	0.037	0.087	0.060	0.058	0.045	0.042	0.069	0.040	0.060	0.092	0.046	0.052	0.034
26	0.077	0.072	0.109	0.009	0.111	0.056	0.040	0.093	0.016	0.061	0.003	0.019	0.066	0.002
27	0.065	0.003	0.070	0.068	0.056	0.088	0.018	0.178	0.021	0.062	0.120	0.024	0.023	0.005
28	0.084	0.051	0.033	0.082	0.004	0.147	0.013	0.320	0.090	0.062	0.160	0.100	0.169	0.040
29	0.358	0.008	0.001	0.162	0.047	0.156	0.074	0.348	0.177	0.060	0.111	0.156	0.144	0.010

TABLE 11

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E VOCABULARY

RAW SCORE SRA EL-E	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
1	0.197	1.073	0.333	1.223	0.296	0.682	1.119	0.061	0.110	0.274	0.398	0.741	0.166	0.812
2	0.180	0.334	0.152	0.484	0.289	0.057	0.380	0.028	0.100	0.241	0.336	0.002	0.178	0.073
3	0.163	0.116	0.049	0.034	0.161	0.218	0.070	0.072	0.090	0.166	0.044	0.293	0.192	0.371
4	0.141	0.304	0.002	0.299	0.048	0.115	0.323	0.021	0.081	0.142	0.075	0.040	0.141	0.038
5	0.118	0.035	0.031	0.178	0.011	0.054	0.054	0.018	0.074	0.127	0.142	0.144	0.064	0.230
6	0.109	0.193	0.048	0.050	0.048	0.147	0.174	0.028	0.067	0.086	0.085	0.084	0.008	0.002
7	0.091	0.071	0.057	0.208	0.072	0.053	0.165	0.052	0.061	0.042	0.015	0.052	0.035	0.144
8	0.072	0.168	0.062	0.029	0.090	0.025	0.114	0.018	0.055	0.005	0.034	0.127	0.072	0.035
9	0.054	0.072	0.064	0.136	0.075	0.077	0.042	0.030	0.050	0.053	0.070	0.021	0.093	0.077
10	0.035	0.080	0.063	0.052	0.049	0.075	0.110	0.018	0.045	0.099	0.083	0.058	0.048	0.075
11	0.017	0.056	0.062	0.092	0.031	0.030	0.014	0.046	0.042	0.039	0.048	0.086	0.011	0.017
12	0.001	0.080	0.059	0.048	0.015	0.003	0.086	0.012	0.039	0.022	0.020	0.020	0.024	0.090
13	0.020	0.030	0.058	0.081	0.002	0.029	0.043	0.014	0.036	0.006	0.001	0.034	0.057	0.039
14	0.039	0.055	0.048	0.030	0.009	0.047	0.022	0.035	0.034	0.039	0.018	0.076	0.068	0.023
15	0.057	0.004	0.041	0.091	0.018	0.059	0.071	0.052	0.033	0.030	0.032	0.045	0.034	0.074
16	0.060	0.070	0.033	0.0	0.026	0.058	0.046	0.044	0.032	0.087	0.041	0.007	0.001	0.043
17	0.039	0.045	0.024	0.072	0.033	0.046	0.005	0.037	0.032	0.014	0.049	0.024	0.030	0.001
18	0.019	0.019	0.014	0.041	0.040	0.039	0.025	0.035	0.033	0.062	0.055	0.049	0.060	0.037
19	0.001	0.072	0.004	0.020	0.045	0.035	0.048	0.026	0.035	0.050	0.058	0.063	0.052	0.066
20	0.020	0.059	0.007	0.070	0.051	0.034	0.063	0.041	0.038	0.028	0.056	0.042	0.023	0.045
21	0.039	0.007	0.030	0.040	0.057	0.036	0.046	0.051	0.042	0.082	0.054	0.025	0.005	0.020
22	0.059	0.046	0.054	0.001	0.053	0.040	0.034	0.059	0.047	0.0	0.054	0.013	0.033	0.001
23	0.052	0.065	0.049	0.034	0.049	0.047	0.029	0.046	0.051	0.084	0.055	0.004	0.059	0.012
24	0.034	0.032	0.062	0.061	0.043	0.047	0.028	0.028	0.043	0.027	0.050	0.002	0.052	0.022
25	0.017	0.066	0.047	0.052	0.039	0.035	0.031	0.006	0.034	0.060	0.044	0.003	0.027	0.026
26	0.001	0.015	0.031	0.035	0.034	0.021	0.040	0.021	0.023	0.055	0.036	0.001	0.003	0.025
27	0.015	0.031	0.013	0.024	0.030	0.005	0.049	0.054	0.009	0.033	0.026	0.005	0.019	0.020
28	0.031	0.042	0.007	0.018	0.024	0.013	0.031	0.066	0.006	0.087	0.015	0.013	0.042	0.010
29	0.047	0.049	0.029	0.018	0.018	0.034	0.008	0.029	0.024	0.004	0.001	0.026	0.063	0.006
30	0.061	0.048	0.052	0.027	0.013	0.048	0.022	0.015	0.046	0.058	0.015	0.044	0.067	0.027
31	0.074	0.043	0.080	0.042	0.005	0.023	0.043	0.071	0.039	0.037	0.035	0.046	0.052	0.053
32	0.066	0.031	0.062	0.055	0.005	0.006	0.002	0.071	0.011	0.060	0.059	0.020	0.040	0.018
33	0.061	0.009	0.039	0.023	0.015	0.040	0.048	0.011	0.024	0.092	0.049	0.015	0.032	0.027
34	0.057	0.022	0.012	0.020	0.030	0.048	0.003	0.067	0.058	0.002	0.022	0.057	0.028	0.028
35	0.058	0.067	0.019	0.046	0.048	0.005	0.035	0.112	0.010	0.106	0.011	0.018	0.030	0.040
36	0.062	0.010	0.059	0.026	0.075	0.047	0.050	0.027	0.052	0.092	0.054	0.046	0.040	0.011
37	0.074	0.073	0.112	0.012	0.114	0.059	0.037	0.096	0.019	0.003	0.089	0.022	0.063	0.001
38	0.098	0.038	0.154	0.032	0.152	0.014	0.041	0.170	0.081	0.120	0.040	0.082	0.107	0.011
39	0.145	0.038	0.140	0.025	0.154	0.122	0.075	0.032	0.030	0.210	0.034	0.037	0.103	0.063
40	0.224	0.107	0.127	0.041	0.156	0.021	0.033	0.276	0.018	0.160	0.162	0.005	0.009	0.027

TABLE 11 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
SRA BL-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
41	0.247	0.163	0.112	0.051	0.158	0.267	0.167	0.459	0.066	0.111	0.274	0.045	0.255	0.121

TABLE 12

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E VOCABULARY

RAW SCORE SRA GR-E	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
1	0.182	0.332	0.150	0.482	0.287	0.059	0.378	0.026	0.102	0.243	0.002	0.224	0.176	0.071
2	0.165	0.344	0.038	0.259	0.008	0.075	0.363	0.066	0.041	0.127	0.040	0.228	0.101	0.078
3	0.026	0.109	0.036	0.034	0.132	0.090	0.090	0.009	0.017	0.002	0.084	0.220	0.076	0.086
4	0.055	0.019	0.065	0.156	0.320	0.105	0.013	0.0	0.072	0.094	0.052	0.098	0.017	0.092
5	0.033	0.093	0.043	0.115	0.054	0.098	0.063	0.051	0.029	0.074	0.021	0.029	0.072	0.098
6	0.069	0.138	0.024	0.006	0.055	0.056	0.090	0.028	0.044	0.047	0.058	0.015	0.075	0.103
7	0.021	0.060	0.039	0.068	0.005	0.023	0.106	0.032	0.019	0.042	0.020	0.048	0.044	0.099
8	0.014	0.064	0.043	0.115	0.036	0.005	0.077	0.048	0.057	0.052	0.034	0.071	0.023	0.073
9	0.037	0.041	0.004	0.046	0.063	0.029	0.054	0.007	0.012	0.075	0.045	0.091	0.011	0.053
10	0.053	0.077	0.026	0.007	0.033	0.051	0.039	0.051	0.025	0.080	0.007	0.061	0.006	0.036
11	0.063	0.069	0.048	0.048	0.009	0.050	0.029	0.013	0.056	0.038	0.024	0.036	0.006	0.023
12	0.064	0.050	0.059	0.083	0.009	0.028	0.024	0.014	0.028	0.013	0.049	0.017	0.011	0.012
13	0.062	0.003	0.049	0.049	0.024	0.008	0.021	0.033	0.004	0.070	0.042	0.0	0.019	0.003
14	0.064	0.032	0.045	0.015	0.034	0.011	0.021	0.044	0.017	0.057	0.025	0.014	0.030	0.005
15	0.058	0.059	0.047	0.014	0.040	0.027	0.021	0.046	0.034	0.013	0.013	0.025	0.046	0.012
16	0.048	0.061	0.053	0.038	0.045	0.043	0.025	0.042	0.049	0.088	0.004	0.035	0.063	0.016
17	0.036	0.034	0.064	0.059	0.045	0.045	0.030	0.030	0.041	0.029	0.002	0.042	0.054	0.020
18	0.020	0.009	0.050	0.055	0.042	0.032	0.034	0.005	0.031	0.057	0.003	0.048	0.030	0.023
19	0.002	0.014	0.032	0.036	0.035	0.020	0.041	0.020	0.022	0.056	0.001	0.054	0.004	0.024
20	0.020	0.036	0.008	0.019	0.025	0.010	0.049	0.059	0.014	0.028	0.005	0.057	0.024	0.025
21	0.044	0.055	0.020	0.005	0.011	0.0	0.044	0.053	0.007	0.074	0.013	0.054	0.055	0.023
22	0.067	0.056	0.055	0.008	0.008	0.008	0.034	0.003	0.002	0.030	0.026	0.052	0.056	0.021
23	0.039	0.037	0.057	0.017	0.031	0.015	0.022	0.059	0.002	0.082	0.044	0.051	0.023	0.017
24	0.007	0.020	0.016	0.025	0.062	0.020	0.010	0.053	0.005	0.030	0.067	0.051	0.015	0.013
25	0.030	0.003	0.034	0.032	0.051	0.023	0.003	0.025	0.007	0.083	0.046	0.053	0.056	0.007
26	0.071	0.011	0.082	0.035	0.015	0.026	0.018	0.091	0.009	0.040	0.020	0.055	0.060	0.002
27	0.046	0.024	0.024	0.038	0.030	0.025	0.033	0.004	0.009	0.077	0.015	0.050	0.017	0.012
28	0.0	0.035	0.045	0.027	0.087	0.024	0.051	0.117	0.010	0.059	0.057	0.045	0.029	0.024
29	0.054	0.045	0.079	0.034	0.037	0.019	0.038	0.0	0.009	0.065	0.067	0.037	0.082	0.039
30	0.076	0.051	0.001	0.028	0.030	0.013	0.017	0.130	0.008	0.088	0.018	0.028	0.048	0.054
31	0.016	0.056	0.105	0.020	0.104	0.001	0.004	0.019	0.006	0.046	0.046	0.016	0.006	0.035
32	0.055	0.056	0.038	0.007	0.022	0.014	0.030	0.124	0.005	0.132	0.097	0.003	0.066	0.009
33	0.096	0.053	0.090	0.010	0.092	0.037	0.059	0.074	0.003	0.019	0.022	0.016	0.085	0.021
34	0.016	0.044	0.072	0.022	0.070	0.068	0.041	0.088	0.001	0.181	0.082	0.037	0.025	0.058
35	0.089	0.027	0.094	0.064	0.080	0.110	0.006	0.202	0.003	0.024	0.096	0.065	0.047	0.029
36	0.108	0.001	0.103	0.062	0.117	0.085	0.038	0.009	0.007	0.173	0.037	0.076	0.140	0.026
37	0.016	0.045	0.133	0.018	0.104	0.047	0.087	0.220	0.010	0.100	0.188	0.047	0.085	0.060
38	0.219	0.162	0.132	0.046	0.161	0.016	0.028	0.271	0.013	0.165	0.005	0.005	0.004	0.032
39	0.110	0.015	0.289	0.121	0.243	0.134	0.065	0.058	0.017	0.290	0.334	0.060	0.146	0.040
40	0.202	0.148	0.157	0.006	0.203	0.312	0.122	0.504	0.021	0.156	0.045	0.179	0.300	0.117

TABLE 12 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E VOCABULARY

RAW SCORE	EQUIVALENT SCORES													
SRA GR-E	CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
41	0.531	0.672	0.890	0.278	0.936	0.310	0.133	1.237	0.025	0.889	0.778	0.264	0.276	0.201

TABLE 13

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE I FORM W WORD MEANING

RAW SCORE SAT I-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-X	SAT II-W
1	0.363	0.967	0.258	1.057	0.130	0.516	0.953	0.105	0.276	0.332	0.166	0.575	0.069	0.646
2	0.109	0.156	0.026	0.306	0.111	0.235	0.202	0.032	0.182	0.068	0.178	0.176	0.059	0.105
3	0.064	0.308	0.139	0.158	0.093	0.026	0.262	0.035	0.060	0.026	0.141	0.101	0.050	0.179
4	0.064	0.099	0.033	0.242	0.075	0.118	0.118	0.043	0.010	0.063	0.064	0.208	0.042	0.167
5	0.102	0.185	0.040	0.042	0.056	0.155	0.166	0.036	0.059	0.078	0.008	0.076	0.032	0.010
6	0.072	0.036	0.082	0.173	0.037	0.088	0.030	0.017	0.089	0.077	0.035	0.017	0.023	0.109
7	0.039	0.165	0.029	0.043	0.018	0.047	0.135	0.017	0.043	0.067	0.072	0.072	0.015	0.107
8	0.013	0.032	0.015	0.100	0.001	0.027	0.062	0.030	0.003	0.051	0.048	0.106	0.005	0.027
9	0.006	0.067	0.051	0.081	0.020	0.019	0.015	0.047	0.031	0.028	0.011	0.075	0.003	0.028
10	0.023	0.104	0.052	0.024	0.039	0.021	0.062	0.012	0.063	0.002	0.024	0.044	0.012	0.066
11	0.037	0.027	0.020	0.098	0.059	0.028	0.090	0.033	0.034	0.029	0.057	0.023	0.021	0.091
12	0.048	0.030	0.007	0.057	0.052	0.040	0.065	0.018	0.001	0.064	0.034	0.011	0.030	0.064
13	0.059	0.071	0.032	0.001	0.027	0.057	0.045	0.045	0.031	0.086	0.001	0.006	0.039	0.042
14	0.064	0.075	0.054	0.042	0.003	0.044	0.035	0.007	0.050	0.044	0.030	0.006	0.049	0.029
15	0.053	0.041	0.048	0.072	0.020	0.017	0.035	0.025	0.017	0.002	0.052	0.011	0.059	0.023
16	0.043	0.016	0.030	0.068	0.043	0.011	0.040	0.052	0.015	0.051	0.023	0.019	0.068	0.022
17	0.034	0.002	0.015	0.045	0.052	0.041	0.051	0.046	0.047	0.087	0.005	0.030	0.061	0.025
18	0.026	0.013	0.001	0.032	0.029	0.031	0.049	0.032	0.025	0.033	0.033	0.046	0.052	0.034
19	0.018	0.020	0.010	0.025	0.009	0.003	0.024	0.024	0.008	0.025	0.052	0.054	0.041	0.047
20	0.010	0.021	0.020	0.025	0.012	0.039	0.004	0.021	0.043	0.087	0.027	0.030	0.032	0.053
21	0.002	0.018	0.028	0.032	0.031	0.024	0.037	0.024	0.026	0.052	0.003	0.004	0.023	0.028
22	0.004	0.012	0.032	0.043	0.049	0.014	0.030	0.035	0.010	0.014	0.019	0.024	0.015	0.001
23	0.011	0.0	0.035	0.060	0.064	0.048	0.011	0.053	0.048	0.086	0.042	0.055	0.007	0.032
24	0.016	0.014	0.034	0.040	0.054	0.008	0.045	0.082	0.021	0.059	0.063	0.023	0.001	0.040
25	0.022	0.035	0.031	0.010	0.047	0.035	0.005	0.068	0.020	0.015	0.052	0.015	0.007	0.002
26	0.026	0.059	0.022	0.024	0.045	0.034	0.042	0.021	0.051	0.100	0.040	0.056	0.013	0.049
27	0.029	0.041	0.007	0.055	0.047	0.008	0.016	0.021	0.008	0.060	0.032	0.017	0.018	0.005
28	0.029	0.006	0.016	0.008	0.058	0.053	0.025	0.095	0.029	0.030	0.028	0.029	0.021	0.053
29	0.028	0.037	0.049	0.048	0.078	0.035	0.044	0.082	0.040	0.136	0.030	0.048	0.022	0.010
30	0.022	0.050	0.069	0.014	0.110	0.007	0.010	0.013	0.012	0.052	0.040	0.006	0.021	0.029
31	0.011	0.010	0.104	0.059	0.088	0.052	0.026	0.159	0.071	0.066	0.063	0.066	0.016	0.057
32	0.009	0.069	0.047	0.007	0.045	0.093	0.066	0.063	0.026	0.156	0.107	0.025	0.007	0.033
33	0.042	0.020	0.047	0.045	0.033	0.065	0.041	0.155	0.044	0.022	0.143	0.047	0.012	0.018
34	0.101	0.040	0.218	0.078	0.189	0.038	0.012	0.135	0.095	0.185	0.103	0.085	0.043	0.016
35	0.215	0.098	0.136	0.050	0.165	0.012	0.024	0.267	0.009	0.169	0.009	0.004	0.098	0.036
36	0.256	0.131	0.143	0.025	0.097	0.012	0.070	0.204	0.129	0.144	0.255	0.146	0.206	0.106
37	0.255	0.204	0.614	0.002	0.660	0.034	0.143	0.961	0.301	0.613	0.502	0.276	0.272	0.008

TABLE 14

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W WORD MEANING

RAW SCORE SAT II-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
1	0.214	0.261	0.079	0.411	0.216	0.130	0.307	0.045	0.173	0.173	0.073	0.071	0.105	0.328
2	0.103	0.266	0.040	0.337	0.086	0.153	0.285	0.007	0.119	0.104	0.038	0.078	0.167	0.145
3	0.107	0.195	0.050	0.052	0.046	0.145	0.176	0.026	0.065	0.088	0.002	0.086	0.010	0.039
4	0.037	0.073	0.027	0.064	0.072	0.060	0.079	0.017	0.020	0.040	0.035	0.092	0.107	0.014
5	0.040	0.005	0.012	0.127	0.026	0.0	0.035	0.047	0.030	0.024	0.075	0.098	0.027	0.045
6	0.034	0.039	0.060	0.109	0.048	0.047	0.013	0.028	0.059	0.056	0.017	0.099	0.028	0.062
7	0.059	0.069	0.014	0.042	0.037	0.068	0.004	0.025	0.003	0.068	0.039	0.073	0.066	0.073
8	0.016	0.094	0.057	0.007	0.014	0.024	0.001	0.046	0.057	0.062	0.023	0.053	0.064	0.079
9	0.017	0.078	0.010	0.043	0.056	0.015	0.003	0.020	0.011	0.044	0.043	0.036	0.042	0.067
10	0.040	0.046	0.025	0.071	0.032	0.047	0.006	0.036	0.033	0.015	0.001	0.023	0.029	0.057
11	0.056	0.018	0.051	0.078	0.003	0.040	0.012	0.002	0.040	0.025	0.037	0.012	0.023	0.050
12	0.065	0.006	0.052	0.046	0.021	0.011	0.018	0.030	0.007	0.073	0.045	0.003	0.022	0.046
13	0.059	0.027	0.040	0.020	0.039	0.016	0.026	0.045	0.022	0.062	0.020	0.005	0.025	0.042
14	0.060	0.047	0.035	0.002	0.052	0.039	0.033	0.058	0.046	0.001	0.001	0.012	0.034	0.041
15	0.064	0.067	0.037	0.022	0.056	0.044	0.041	0.058	0.039	0.072	0.012	0.016	0.047	0.040
16	0.056	0.054	0.044	0.039	0.052	0.025	0.050	0.050	0.021	0.049	0.022	0.020	0.064	0.040
17	0.043	0.032	0.058	0.054	0.055	0.009	0.049	0.032	0.008	0.034	0.026	0.023	0.053	0.041
18	0.026	0.010	0.056	0.060	0.059	0.004	0.039	0.004	0.002	0.080	0.025	0.024	0.028	0.042
19	0.005	0.011	0.033	0.044	0.050	0.015	0.029	0.034	0.011	0.013	0.020	0.025	0.001	0.044
20	0.021	0.032	0.003	0.028	0.034	0.023	0.021	0.076	0.016	0.057	0.010	0.023	0.032	0.047
21	0.052	0.054	0.034	0.013	0.013	0.029	0.013	0.024	0.019	0.009	0.005	0.021	0.068	0.051
22	0.056	0.054	0.074	0.0	0.014	0.032	0.005	0.042	0.019	0.059	0.027	0.017	0.040	0.052
23	0.020	0.033	0.029	0.012	0.049	0.033	0.003	0.066	0.018	0.017	0.054	0.013	0.002	0.048
24	0.023	0.010	0.027	0.025	0.058	0.030	0.010	0.018	0.014	0.090	0.053	0.007	0.049	0.043
25	0.073	0.013	0.080	0.037	0.013	0.024	0.016	0.089	0.007	0.042	0.018	0.002	0.058	0.038
26	0.034	0.036	0.012	0.050	0.042	0.013	0.021	0.016	0.003	0.065	0.027	0.012	0.005	0.032
27	0.024	0.059	0.069	0.059	0.067	0.0	0.027	0.093	0.014	0.083	0.081	0.024	0.053	0.027
28	0.085	0.050	0.040	0.048	0.002	0.020	0.031	0.039	0.030	0.026	0.028	0.039	0.056	0.020
29	0.018	0.027	0.059	0.038	0.088	0.045	0.034	0.072	0.050	0.137	0.040	0.058	0.010	0.014
30	0.064	0.003	0.053	0.026	0.024	0.067	0.037	0.099	0.062	0.034	0.072	0.054	0.086	0.006
31	0.051	0.021	0.070	0.015	0.086	0.036	0.039	0.016	0.041	0.081	0.011	0.035	0.029	0.001
32	0.046	0.047	0.047	0.002	0.031	0.005	0.039	0.133	0.014	0.123	0.106	0.009	0.057	0.010
33	0.075	0.074	0.111	0.011	0.113	0.058	0.038	0.099	0.018	0.002	0.001	0.021	0.064	0.020
34	0.042	0.051	0.014	0.026	0.012	0.067	0.035	0.030	0.059	0.123	0.126	0.058	0.033	0.029
35	0.087	0.027	0.143	0.043	0.141	0.003	0.030	0.159	0.070	0.121	0.011	0.071	0.096	0.042
36	0.060	0.002	0.065	0.063	0.051	0.083	0.023	0.173	0.026	0.005	0.125	0.029	0.018	0.055
37	0.082	0.025	0.077	0.079	0.091	0.059	0.012	0.031	0.033	0.147	0.063	0.026	0.124	0.070
38	0.117	0.056	0.227	0.062	0.205	0.054	0.004	0.119	0.111	0.201	0.087	0.101	0.016	0.074
39	0.044	0.091	0.073	0.042	0.044	0.107	0.027	0.280	0.050	0.040	0.200	0.060	0.145	0.066
40	0.217	0.082	0.100	0.014	0.129	0.048	0.060	0.303	0.045	0.133	0.027	0.032	0.036	0.058

TABLE 14 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W WORD MEANING

RAW SCORE	EQUIVALENT SCORES												
SAT II-W	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
41	0.061	0.056	0.290	0.024	0.319	0.142	0.106	0.113	0.145	0.323	0.163	0.158	0.154	0.049
42	0.150	0.025	0.249	0.081	0.203	0.094	0.105	0.098	0.023	0.250	0.361	0.040	0.106	0.039
43	0.368	0.018	0.009	0.159	0.037	0.146	0.064	0.338	0.187	0.010	0.121	0.166	0.134	0.029
44	0.085	0.081	0.274	0.111	0.320	0.306	0.005	0.621	0.096	0.273	0.162	0.117	0.340	0.016
45	0.263	0.196	0.622	0.010	0.668	0.042	0.135	0.969	0.293	0.621	0.510	0.268	0.008	0.003
46	0.732	0.273	1.091	0.256	1.137	0.511	0.334	1.438	0.176	1.090	0.979	0.201	0.477	0.013
47	1.490	0.282	1.849	0.502	1.895	1.269	0.314	2.196	0.934	1.848	1.737	0.959	1.235	0.030

Appendix F

Assignment Errors - Comprehension

TABLE 1

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 3 FORM A COMPREHENSION

RAW SCORE	EQUIVALENT SCORES														
	CAT 2-A	CAT 3-B	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.434	1.134	0.088	1.277	0.056	0.404	1.203	0.160	0.422	1.076	0.052	1.148	0.075	0.971	
2	0.336	0.371	0.032	0.514	0.008	0.357	0.442	0.145	0.341	0.313	0.037	0.385	0.113	0.208	
3	0.051	0.101	0.0	0.042	0.036	0.115	0.032	0.002	0.077	0.159	0.024	0.087	0.148	0.264	
4	0.065	0.328	0.029	0.310	0.078	0.040	0.327	0.085	0.021	0.234	0.011	0.284	0.076	0.106	
5	0.128	0.044	0.055	0.131	0.089	0.013	0.043	0.013	0.070	0.050	0.0	0.0	0.008	0.178	
6	0.116	0.199	0.080	0.112	0.023	0.010	0.200	0.070	0.095	0.165	0.011	0.192	0.048	0.013	
7	0.046	0.075	0.069	0.113	0.033	0.018	0.011	0.004	0.111	0.048	0.022	0.021	0.058	0.117	
8	0.005	0.117	0.033	0.079	0.045	0.033	0.125	0.045	0.081	0.101	0.033	0.105	0.005	0.075	
9	0.044	0.071	0.002	0.067	0.010	0.032	0.050	0.036	0.055	0.074	0.043	0.070	0.040	0.002	
10	0.076	0.091	0.025	0.095	0.044	0.056	0.030	0.004	0.037	0.041	0.053	0.023	0.035	0.051	
11	0.074	0.050	0.051	0.008	0.009	0.022	0.078	0.038	0.024	0.112	0.065	0.083	0.008	0.081	
12	0.040	0.094	0.043	0.081	0.031	0.011	0.066	0.045	0.014	0.019	0.051	0.061	0.047	0.063	
13	0.012	0.017	0.018	0.057	0.020	0.045	0.031	0.018	0.007	0.054	0.034	0.012	0.013	0.038	
14	0.013	0.102	0.006	0.001	0.012	0.013	0.011	0.007	0.003	0.079	0.017	0.021	0.025	0.024	
15	0.034	0.026	0.028	0.040	0.037	0.025	0.002	0.028	0.0	0.016	0.0	0.044	0.029	0.017	
16	0.053	0.044	0.049	0.069	0.010	0.017	0.002	0.046	0.001	0.036	0.016	0.058	0.008	0.016	
17	0.063	0.078	0.033	0.053	0.013	0.026	0.009	0.043	0.001	0.081	0.033	0.064	0.042	0.021	
18	0.043	0.021	0.013	0.030	0.033	0.006	0.021	0.029	0.001	0.039	0.050	0.055	0.005	0.031	
19	0.027	0.025	0.005	0.015	0.016	0.032	0.039	0.017	0.004	0.002	0.032	0.051	0.030	0.044	
20	0.012	0.060	0.023	0.007	0.001	0.017	0.027	0.006	0.008	0.037	0.012	0.053	0.016	0.034	
21	0.001	0.057	0.040	0.004	0.017	0.001	0.004	0.002	0.014	0.068	0.008	0.047	0.020	0.009	
22	0.013	0.030	0.045	0.006	0.032	0.014	0.039	0.008	0.022	0.049	0.028	0.033	0.024	0.019	
23	0.022	0.011	0.030	0.012	0.019	0.024	0.002	0.012	0.030	0.020	0.048	0.016	0.012	0.035	
24	0.030	0.001	0.016	0.024	0.007	0.029	0.024	0.015	0.041	0.005	0.025	0.006	0.031	0.003	
25	0.037	0.008	0.004	0.038	0.006	0.029	0.026	0.014	0.052	0.031	0.004	0.029	0.007	0.037	
26	0.042	0.007	0.009	0.044	0.018	0.029	0.015	0.011	0.041	0.054	0.020	0.035	0.037	0.008	
27	0.044	0.001	0.020	0.020	0.031	0.028	0.011	0.005	0.026	0.070	0.044	0.002	0.003	0.020	
28	0.046	0.012	0.031	0.009	0.027	0.021	0.015	0.005	0.008	0.051	0.033	0.035	0.041	0.034	
29	0.044	0.030	0.039	0.042	0.016	0.012	0.026	0.021	0.012	0.030	0.009	0.015	0.002	0.019	
30	0.041	0.053	0.048	0.018	0.004	0.001	0.012	0.043	0.035	0.011	0.018	0.031	0.043	0.011	
31	0.033	0.020	0.055	0.024	0.009	0.018	0.015	0.074	0.058	0.011	0.046	0.011	0.004	0.009	
32	0.022	0.022	0.059	0.027	0.024	0.027	0.006	0.076	0.031	0.036	0.049	0.046	0.045	0.015	
33	0.015	0.035	0.062	0.029	0.043	0.003	0.017	0.042	0.0	0.064	0.023	0.013	0.009	0.028	
34	0.017	0.027	0.061	0.014	0.034	0.027	0.019	0.008	0.038	0.100	0.006	0.018	0.045	0.025	
35	0.050	0.008	0.055	0.055	0.015	0.014	0.010	0.083	0.068	0.086	0.038	0.048	0.019	0.006	
36	0.065	0.031	0.041	0.030	0.010	0.028	0.013	0.123	0.023	0.059	0.075	0.043	0.045	0.032	
37	0.014	0.038	0.016	0.003	0.047	0.014	0.013	0.033	0.034	0.020	0.097	0.027	0.038	0.029	
38	0.063	0.025	0.034	0.022	0.070	0.050	0.028	0.135	0.112	0.041	0.080	0.013	0.042	0.018	
39	0.050	0.023	0.137	0.044	0.025	0.006	0.025	0.203	0.037	0.156	0.063	0.0	0.081	0.028	
40	0.121	0.054	0.319	0.064	0.075	0.070	0.016	0.070	0.091	0.300	0.045	0.010	0.038	0.080	

TABLE 1 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 3 FORM A COMPREHENSION

RAW SCORE	EQUIVALENT SCORES														
CAT 3-A	CAT 3-B	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.059	0.125	0.333	0.082	0.241	0.123	0.029	0.672	0.342	0.305	0.027	0.018	0.268	0.022

TABLE 2

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 4 FORM A COMPREHENSION

RAW SCORE CAT 4-A	EQUIVALENT SCORES CAT 3-A	CAT 4-B	CTBS 2-C	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.101	0.826	0.101	0.143	0.065	0.014	0.069	0.095	0.024	0.058	0.125	0.014	0.047	0.163
2	0.044	0.049	0.099	0.087	0.045	0.057	0.001	0.057	0.026	0.094	0.044	0.044	0.036	0.212
3	0.075	0.348	0.006	0.038	0.033	0.084	0.064	0.068	0.036	0.123	0.084	0.096	0.017	0.042
4	0.171	0.009	0.066	0.004	0.030	0.018	0.121	0.035	0.054	0.132	0.038	0.114	0.011	0.069
5	0.050	0.190	0.021	0.042	0.035	0.028	0.028	0.027	0.074	0.075	0.019	0.033	0.047	0.031
6	0.017	0.055	0.001	0.074	0.037	0.036	0.048	0.001	0.024	0.037	0.017	0.029	0.004	0.055
7	0.026	0.095	0.002	0.066	0.011	0.001	0.024	0.002	0.026	0.010	0.026	0.070	0.035	0.009
8	0.044	0.696	0.010	0.025	0.019	0.027	0.046	0.015	0.043	0.008	0.045	0.014	0.035	0.057
9	0.021	0.025	0.034	0.009	0.016	0.027	0.0	0.050	0.020	0.018	0.029	0.034	0.026	0.010
10	0.025	0.113	0.030	0.040	0.027	0.007	0.030	0.008	0.029	0.023	0.007	0.040	0.027	0.031
11	0.057	0.036	0.017	0.053	0.008	0.009	0.033	0.054	0.043	0.023	0.048	0.002	0.037	0.026
12	0.030	0.642	0.027	0.024	0.004	0.021	0.009	0.022	0.008	0.019	0.002	0.040	0.026	0.011
13	0.011	0.091	0.041	0.001	0.008	0.028	0.009	0.001	0.019	0.009	0.038	0.027	0.001	0.039
14	0.001	0.023	0.015	0.025	0.008	0.028	0.023	0.016	0.042	0.004	0.024	0.007	0.030	0.004
15	0.008	0.032	0.004	0.046	0.002	0.024	0.033	0.022	0.047	0.023	0.004	0.037	0.015	0.029
16	0.007	0.078	0.016	0.037	0.011	0.025	0.022	0.018	0.034	0.047	0.027	0.028	0.030	0.015
17	0.001	0.036	0.021	0.019	0.030	0.027	0.012	0.006	0.025	0.071	0.045	0.001	0.004	0.019
18	0.012	0.005	0.019	0.003	0.015	0.027	0.003	0.017	0.020	0.039	0.045	0.023	0.034	0.022
19	0.030	0.040	0.009	0.012	0.014	0.012	0.004	0.051	0.018	0.0	0.039	0.045	0.028	0.011
20	0.056	0.067	0.008	0.024	0.023	0.007	0.010	0.066	0.021	0.045	0.038	0.025	0.007	0.027
21	0.053	0.036	0.034	0.035	0.019	0.008	0.017	0.010	0.028	0.064	0.043	0.007	0.010	0.008
22	0.020	0.010	0.071	0.044	0.011	0.026	0.022	0.054	0.038	0.009	0.054	0.009	0.024	0.029
23	0.022	0.012	0.037	0.049	0.038	0.017	0.028	0.054	0.053	0.058	0.054	0.024	0.034	0.007
24	0.073	0.030	0.011	0.044	0.025	0.008	0.024	0.031	0.055	0.050	0.037	0.037	0.041	0.028
25	0.035	0.044	0.075	0.042	0.008	0.032	0.018	0.077	0.035	0.029	0.012	0.048	0.044	0.011
26	0.027	0.054	0.034	0.041	0.007	0.0	0.012	0.035	0.011	0.080	0.021	0.045	0.043	0.023
27	0.083	0.051	0.048	0.042	0.017	0.037	0.006	0.075	0.021	0.017	0.065	0.041	0.038	0.019
28	0.008	0.045	0.063	0.047	0.023	0.006	0.002	0.075	0.060	0.054	0.046	0.040	0.027	0.014
29	0.085	0.042	0.044	0.055	0.025	0.026	0.010	0.038	0.053	0.026	0.010	0.042	0.010	0.033
30	0.031	0.044	0.072	0.061	0.021	0.029	0.019	0.154	0.008	0.050	0.083	0.047	0.014	0.001
31	0.085	0.056	0.069	0.052	0.010	0.002	0.031	0.052	0.051	0.065	0.035	0.058	0.047	0.032
32	0.038	0.048	0.054	0.041	0.009	0.024	0.025	0.071	0.072	0.058	0.059	0.065	0.076	0.024
33	0.108	0.034	0.142	0.026	0.038	0.050	0.013	0.199	0.004	0.149	0.069	0.055	0.037	0.009
34	0.025	0.014	0.009	0.003	0.082	0.042	0.003	0.110	0.087	0.016	0.055	0.038	0.017	0.043
35	0.166	0.012	0.132	0.026	0.059	0.028	0.022	0.031	0.054	0.125	0.086	0.013	0.091	0.028
36	0.023	0.046	0.160	0.067	0.002	0.017	0.042	0.180	0.060	0.179	0.086	0.023	0.058	0.005
37	0.138	0.027	0.001	0.054	0.083	0.010	0.019	0.341	0.101	0.018	0.075	0.075	0.036	0.042
38	0.141	0.026	0.178	0.053	0.094	0.008	0.011	0.211	0.050	0.159	0.186	0.102	0.141	0.060
39	0.054	0.034	0.356	0.010	0.021	0.016	0.055	0.016	0.145	0.354	0.009	0.044	0.016	0.026
40	0.278	0.051	0.132	0.108	0.203	0.035	0.032	0.208	0.076	0.160	0.233	0.049	0.197	0.017

TABLE 2 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CAT LEVEL 4 FORM A COMPREHENSION

RAW SCORE	EQUIVALENT SCORES													
CAT 4-A	CAT 3-A	CAT 4-B	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.202	0.020	0.131	0.155	0.039	0.079	0.030	0.471	0.187	0.103	0.229	0.214	0.066	0.070
42	0.125	0.004	0.468	0.043	0.349	0.177	0.096	0.798	0.217	0.430	0.098	0.107	0.331	0.147
43	0.570	0.024	0.903	0.238	0.096	0.268	0.066	1.243	0.228	0.875	0.543	0.170	0.114	0.154
44	1.301	0.160	1.634	0.493	0.827	0.287	0.301	1.974	0.959	1.606	1.274	0.561	0.845	0.143

TABLE 3

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 2 FORM Q COMPREHENSION

RAW SCORE CTBS 2-C	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-R	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.068	1.066	0.832	1.209	0.012	0.336	1.135	0.092	0.354	1.008	0.016	1.080	0.143	0.903
2	0.032	0.359	0.107	0.482	0.024	0.325	0.408	0.163	0.362	0.281	0.005	0.353	0.145	0.176
3	0.0	0.101	0.330	0.042	0.036	0.115	0.032	0.002	0.077	0.159	0.024	0.087	0.148	0.264
4	0.029	0.357	0.076	0.281	0.049	0.311	0.355	0.091	0.050	0.263	0.040	0.313	0.105	0.135
5	0.055	0.099	0.181	0.186	0.062	0.042	0.098	0.042	0.125	0.005	0.055	0.055	0.063	0.123
6	0.080	0.119	0.243	0.092	0.074	0.070	0.120	0.007	0.093	0.213	0.069	0.163	0.032	0.093
7	0.102	0.177	0.146	0.215	0.069	0.084	0.113	0.041	0.016	0.054	0.080	0.081	0.008	0.098
8	0.069	0.066	0.008	0.044	0.039	0.087	0.058	0.065	0.042	0.117	0.090	0.090	0.011	0.048
9	0.033	0.150	0.112	0.112	0.012	0.066	0.092	0.051	0.087	0.068	0.066	0.072	0.028	0.108
10	0.002	0.069	0.031	0.065	0.012	0.054	0.052	0.034	0.057	0.076	0.045	0.072	0.042	0.0
11	0.025	0.066	0.054	0.070	0.036	0.048	0.055	0.021	0.012	0.066	0.028	0.048	0.055	0.076
12	0.051	0.101	0.072	0.059	0.042	0.046	0.072	0.013	0.027	0.061	0.014	0.079	0.043	0.051
13	0.071	0.021	0.0	0.063	0.014	0.049	0.007	0.006	0.059	0.054	0.002	0.012	0.026	0.010
14	0.043	0.112	0.056	0.038	0.012	0.050	0.064	0.002	0.057	0.062	0.008	0.083	0.011	0.057
15	0.018	0.001	0.055	0.075	0.038	0.035	0.049	0.0	0.025	0.036	0.016	0.030	0.005	0.056
16	0.006	0.108	0.007	0.005	0.018	0.019	0.005	0.001	0.003	0.073	0.023	0.027	0.019	0.018
17	0.028	0.002	0.032	0.068	0.009	0.003	0.026	0.0	0.028	0.012	0.028	0.072	0.033	0.011
18	0.049	0.093	0.064	0.036	0.036	0.016	0.047	0.003	0.050	0.085	0.033	0.032	0.041	0.033
19	0.054	0.010	0.037	0.015	0.009	0.037	0.056	0.005	0.053	0.018	0.035	0.004	0.025	0.047
20	0.033	0.066	0.010	0.057	0.020	0.018	0.042	0.010	0.032	0.048	0.037	0.032	0.009	0.054
21	0.013	0.034	0.013	0.043	0.020	0.007	0.034	0.016	0.014	0.052	0.038	0.054	0.008	0.044
22	0.065	0.030	0.030	0.010	0.011	0.034	0.034	0.022	0.001	0.007	0.037	0.046	0.025	0.039
23	0.023	0.070	0.044	0.016	0.024	0.006	0.040	0.029	0.015	0.060	0.035	0.030	0.039	0.039
24	0.040	0.017	0.054	0.036	0.009	0.026	0.036	0.038	0.026	0.040	0.032	0.019	0.020	0.043
25	0.057	0.027	0.046	0.051	0.023	0.006	0.018	0.049	0.035	0.008	0.029	0.013	0.001	0.038
26	0.045	0.061	0.040	0.051	0.013	0.031	0.006	0.053	0.042	0.052	0.023	0.012	0.021	0.022
27	0.030	0.041	0.038	0.042	0.016	0.006	0.032	0.042	0.048	0.050	0.018	0.014	0.039	0.005
28	0.016	0.015	0.029	0.040	0.023	0.013	0.008	0.031	0.051	0.011	0.009	0.022	0.015	0.019
29	0.004	0.004	0.045	0.042	0.002	0.028	0.030	0.018	0.051	0.027	0.0	0.033	0.011	0.033
30	0.009	0.016	0.046	0.048	0.027	0.020	0.006	0.002	0.050	0.063	0.011	0.044	0.037	0.001
31	0.020	0.021	0.034	0.040	0.018	0.012	0.009	0.015	0.046	0.050	0.024	0.022	0.017	0.036
32	0.031	0.019	0.017	0.022	0.004	0.008	0.016	0.036	0.039	0.020	0.040	0.004	0.015	0.003
33	0.039	0.009	0.005	0.003	0.023	0.010	0.013	0.060	0.027	0.009	0.048	0.036	0.037	0.020
34	0.048	0.008	0.032	0.032	0.031	0.015	0.002	0.068	0.013	0.037	0.030	0.017	0.001	0.035
35	0.055	0.034	0.040	0.031	0.015	0.026	0.017	0.044	0.006	0.066	0.009	0.027	0.044	0.026
36	0.059	0.037	0.051	0.015	0.001	0.020	0.008	0.017	0.033	0.080	0.017	0.013	0.003	0.028
37	0.062	0.011	0.047	0.033	0.014	0.003	0.022	0.020	0.062	0.061	0.048	0.048	0.052	0.034
38	0.061	0.034	0.010	0.033	0.027	0.034	0.022	0.069	0.023	0.046	0.055	0.024	0.009	0.011
39	0.055	0.048	0.059	0.006	0.040	0.009	0.005	0.123	0.027	0.031	0.017	0.007	0.036	0.029
40	0.041	0.044	0.017	0.011	0.051	0.013	0.028	0.082	0.064	0.018	0.034	0.002	0.054	0.011

TABLE 3 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 2 FORM Q COMPREHENSION

RAW SCORE CTBS 2-C	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-R	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.016	0.054	0.024	0.013	0.063	0.030	0.029	0.017	0.018	0.004	0.104	0.011	0.022	0.013
42	0.054	0.069	0.063	0.012	0.073	0.033	0.006	0.101	0.078	0.007	0.046	0.047	0.008	0.051
43	0.137	0.101	0.099	0.093	0.084	0.011	0.018	0.340	0.100	0.019	0.074	0.076	0.037	0.041
44	0.333	0.131	0.134	0.024	0.092	0.097	0.012	0.340	0.056	0.028	0.360	0.083	0.065	0.061

TABLE 4

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 3 FORM Q COMPREHENSION

RAW SCORE CTBS 3-Q	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-R	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GP-E	SAT I-W	SAT II-W
1	0.042	0.143	0.042	0.565	0.078	0.157	0.074	0.044	0.119	0.201	0.018	0.129	0.131	0.306
2	0.112	0.087	0.032	0.173	0.042	0.102	0.088	0.025	0.061	0.181	0.101	0.131	0.064	0.125
3	0.079	0.038	0.044	0.103	0.005	0.046	0.102	0.030	0.002	0.161	0.046	0.134	0.055	0.004
4	0.067	0.004	0.065	0.210	0.034	0.022	0.117	0.031	0.058	0.136	0.042	0.118	0.015	0.065
5	0.008	0.042	0.059	0.057	0.017	0.014	0.070	0.046	0.032	0.117	0.061	0.075	0.016	0.073
6	0.057	0.074	0.038	0.039	0.037	0.012	0.026	0.036	0.050	0.100	0.030	0.045	0.027	0.019
7	0.001	0.103	0.005	0.098	0.013	0.014	0.010	0.006	0.002	0.078	0.018	0.022	0.024	0.023
8	0.040	0.066	0.036	0.078	0.0	0.020	0.042	0.039	0.040	0.056	0.040	0.004	0.011	0.057
9	0.053	0.025	0.015	0.021	0.006	0.027	0.044	0.010	0.054	0.033	0.020	0.011	0.010	0.032
10	0.030	0.009	0.043	0.019	0.007	0.036	0.009	0.047	0.029	0.009	0.020	0.025	0.035	0.001
11	0.015	0.040	0.010	0.049	0.001	0.024	0.024	0.032	0.011	0.017	0.047	0.036	0.015	0.029
12	0.007	0.067	0.016	0.072	0.008	0.010	0.034	0.013	0.001	0.044	0.019	0.046	0.023	0.041
13	0.064	0.053	0.036	0.052	0.021	0.005	0.0	0.002	0.010	0.072	0.004	0.051	0.016	0.013
14	0.006	0.024	0.051	0.028	0.028	0.020	0.033	0.002	0.016	0.043	0.022	0.039	0.030	0.013
15	0.012	0.001	0.042	0.010	0.007	0.027	0.010	0.0	0.018	0.008	0.037	0.028	0.0	0.038
16	0.024	0.025	0.040	0.004	0.017	0.009	0.023	0.005	0.017	0.029	0.047	0.018	0.026	0.021
17	0.038	0.046	0.042	0.016	0.022	0.009	0.012	0.024	0.014	0.069	0.042	0.009	0.031	0.003
18	0.057	0.057	0.048	0.025	0.008	0.028	0.024	0.046	0.010	0.034	0.037	0.001	0.011	0.028
19	0.044	0.037	0.053	0.032	0.026	0.012	0.006	0.055	0.003	0.010	0.036	0.009	0.007	0.024
20	0.020	0.019	0.040	0.036	0.011	0.008	0.031	0.025	0.006	0.057	0.037	0.018	0.023	0.0
21	0.009	0.003	0.022	0.040	0.018	0.030	0.006	0.014	0.017	0.042	0.042	0.026	0.037	0.025
22	0.042	0.012	0.003	0.042	0.026	0.007	0.016	0.003	0.030	0.012	0.051	0.033	0.040	0.023
23	0.057	0.024	0.032	0.042	0.001	0.017	0.024	0.036	0.045	0.069	0.048	0.042	0.031	0.003
24	0.018	0.035	0.066	0.042	0.022	0.019	0.006	0.025	0.033	0.029	0.036	0.042	0.025	0.029
25	0.024	0.044	0.031	0.040	0.033	0.006	0.009	0.075	0.037	0.035	0.022	0.035	0.020	0.015
26	0.074	0.052	0.015	0.036	0.014	0.030	0.023	0.002	0.018	0.065	0.002	0.028	0.018	0.013
27	0.027	0.049	0.070	0.031	0.003	0.0	0.021	0.090	0.004	0.009	0.022	0.022	0.018	0.031
28	0.029	0.044	0.033	0.024	0.019	0.032	0.011	0.013	0.029	0.093	0.052	0.016	0.020	0.001
29	0.077	0.042	0.033	0.017	0.034	0.004	0.002	0.102	0.056	0.013	0.054	0.009	0.024	0.031
30	0.014	0.041	0.075	0.007	0.048	0.032	0.005	0.006	0.052	0.086	0.020	0.004	0.031	0.011
31	0.061	0.042	0.006	0.005	0.046	0.003	0.011	0.117	0.021	0.025	0.023	0.001	0.042	0.023
32	0.055	0.047	0.110	0.020	0.041	0.040	0.015	0.028	0.013	0.092	0.076	0.007	0.056	0.018
33	0.030	0.055	0.011	0.036	0.040	0.002	0.017	0.092	0.053	0.029	0.045	0.013	0.065	0.022
34	0.097	0.052	0.121	0.054	0.042	0.037	0.017	0.104	0.074	0.117	0.017	0.019	0.052	0.020
35	0.003	0.041	0.013	0.034	0.050	0.017	0.016	0.030	0.031	0.017	0.100	0.024	0.035	0.026
36	0.134	0.026	0.156	0.009	0.064	0.024	0.013	0.173	0.022	0.160	0.043	0.029	0.011	0.017
37	0.022	0.003	0.012	0.021	0.085	0.045	0.006	0.113	0.090	0.019	0.058	0.035	0.020	0.040
38	0.146	0.026	0.158	0.060	0.085	0.002	0.004	0.057	0.080	0.151	0.112	0.039	0.065	0.002
39	0.044	0.067	0.093	0.046	0.069	0.050	0.019	0.247	0.007	0.112	0.019	0.044	0.125	0.052
40	0.194	0.053	0.125	0.005	0.041	0.061	0.043	0.264	0.103	0.106	0.199	0.049	0.088	0.033

TABLE 4 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

CTBS LEVEL 3 FORM Q COMPREHENSION

RAW SCORE	EQUIVALENT SCORES													
CTBS 3-C	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-R	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.064	0.010	0.346	0.076	0.011	0.006	0.045	0.006	0.155	0.364	0.019	0.054	0.026	0.016
42	0.357	0.108	0.024	0.074	0.116	0.073	0.012	0.316	0.032	0.052	0.341	0.059	0.089	0.085
43	0.082	0.043	0.415	0.047	0.323	0.205	0.053	0.755	0.260	0.367	0.055	0.064	0.350	0.104
44	0.808	0.238	1.141	0.339	0.334	0.206	0.192	1.481	0.466	1.113	0.781	0.068	0.352	0.084

TABLE 5

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 10 FORM 5 COMPREHENSION

RAW SCORE ITBS 10-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-6	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.056	1.078	0.012	1.221	0.376	0.348	1.147	0.104	0.366	1.020	0.004	1.092	0.131	0.915
2	0.008	0.363	0.024	0.506	0.342	0.349	0.432	0.153	0.349	0.305	0.029	0.377	0.121	0.200
3	0.036	0.065	0.036	0.078	0.057	0.079	0.004	0.034	0.041	0.123	0.060	0.051	0.112	0.228
4	0.078	0.375	0.049	0.232	0.058	0.038	0.306	0.042	0.099	0.312	0.089	0.361	0.101	0.184
5	0.117	0.161	0.062	0.248	0.119	0.104	0.160	0.082	0.146	0.067	0.117	0.117	0.091	0.061
6	0.089	0.045	0.074	0.042	0.089	0.102	0.046	0.067	0.019	0.139	0.089	0.089	0.081	0.167
7	0.023	0.222	0.088	0.135	0.024	0.033	0.201	0.047	0.072	0.142	0.034	0.169	0.071	0.010
8	0.053	0.108	0.069	0.146	0.023	0.015	0.044	0.037	0.085	0.015	0.011	0.012	0.061	0.150
9	0.084	0.033	0.039	0.005	0.056	0.051	0.097	0.035	0.003	0.156	0.051	0.129	0.050	0.009
10	0.045	0.162	0.012	0.124	0.076	0.078	0.080	0.039	0.075	0.056	0.078	0.060	0.040	0.120
11	0.010	0.081	0.012	0.077	0.041	0.042	0.040	0.046	0.045	0.064	0.033	0.060	0.030	0.012
12	0.061	0.030	0.036	0.034	0.014	0.012	0.091	0.057	0.024	0.102	0.008	0.084	0.019	0.099
13	0.044	0.135	0.058	0.117	0.008	0.012	0.014	0.048	0.081	0.003	0.044	0.021	0.009	0.007
14	0.069	0.059	0.042	0.017	0.026	0.031	0.087	0.025	0.015	0.103	0.056	0.092	0.001	0.090
15	0.059	0.035	0.014	0.077	0.041	0.048	0.007	0.008	0.045	0.040	0.016	0.002	0.012	0.004
16	0.031	0.124	0.012	0.050	0.052	0.042	0.076	0.014	0.045	0.050	0.020	0.092	0.023	0.069
17	0.020	0.037	0.038	0.037	0.036	0.025	0.011	0.038	0.012	0.074	0.054	0.008	0.033	0.018
18	0.064	0.047	0.046	0.068	0.022	0.011	0.058	0.046	0.066	0.010	0.030	0.076	0.044	0.045
19	0.012	0.090	0.018	0.013	0.012	0.001	0.023	0.015	0.015	0.091	0.005	0.009	0.037	0.036
20	0.037	0.011	0.009	0.077	0.002	0.012	0.035	0.009	0.037	0.021	0.037	0.070	0.024	0.020
21	0.040	0.066	0.036	0.0	0.006	0.020	0.042	0.035	0.040	0.056	0.040	0.004	0.011	0.057
22	0.010	0.054	0.039	0.075	0.013	0.027	0.008	0.036	0.011	0.046	0.006	0.068	0.002	0.006
23	0.059	0.019	0.009	0.006	0.018	0.033	0.050	0.004	0.060	0.027	0.026	0.005	0.016	0.038
24	0.013	0.086	0.020	0.066	0.023	0.038	0.022	0.030	0.012	0.068	0.046	0.052	0.029	0.034
25	0.037	0.016	0.050	0.007	0.028	0.032	0.016	0.040	0.036	0.002	0.013	0.018	0.041	0.006
26	0.033	0.054	0.020	0.063	0.031	0.027	0.046	0.004	0.034	0.072	0.018	0.034	0.028	0.041
27	0.016	0.041	0.011	0.001	0.033	0.023	0.023	0.033	0.012	0.048	0.035	0.014	0.028	
28	0.052	0.027	0.043	0.059	0.035	0.020	0.003	0.035	0.056	0.050	0.020	0.013	0.0	0.004
29	0.001	0.059	0.024	0.008	0.034	0.018	0.026	0.005	0.009	0.036	0.011	0.054	0.015	0.033
30	0.049	0.008	0.009	0.045	0.033	0.017	0.041	0.047	0.035	0.031	0.041	0.010	0.029	0.034
31	0.017	0.070	0.043	0.021	0.032	0.016	0.021	0.015	0.031	0.051	0.025	0.030	0.037	0.008
32	0.034	0.004	0.023	0.028	0.031	0.017	0.005	0.026	0.012	0.015	0.006	0.036	0.022	0.015
33	0.032	0.062	0.013	0.038	0.031	0.018	0.007	0.040	0.054	0.065	0.036	0.001	0.008	0.035
34	0.019	0.008	0.049	0.027	0.031	0.020	0.017	0.007	0.011	0.001	0.030	0.035	0.007	0.031
35	0.046	0.057	0.016	0.049	0.032	0.022	0.026	0.058	0.032	0.066	0.002	0.030	0.023	0.011
36	0.007	0.008	0.023	0.017	0.032	0.026	0.031	0.008	0.034	0.012	0.032	0.001	0.038	0.004
37	0.059	0.058	0.043	0.022	0.029	0.030	0.034	0.046	0.008	0.054	0.034	0.031	0.028	0.019
38	0.006	0.002	0.002	0.044	0.027	0.026	0.032	0.020	0.049	0.025	0.002	0.035	0.013	0.031
39	0.049	0.056	0.040	0.008	0.023	0.020	0.032	0.038	0.018	0.042	0.029	0.009	0.003	0.036
40	0.018	0.011	0.027	0.026	0.019	0.014	0.032	0.029	0.023	0.036	0.038	0.017	0.019	0.026

TABLE 5 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 10 FORM 5 COMPREHENSION

RAW SCORE ITBS 10-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-6	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.038	0.039	0.018	0.042	0.015	0.006	0.027	0.033	0.045	0.032	0.006	0.040	0.035	0.018
42	0.031	0.030	0.051	0.011	0.010	0.003	0.020	0.036	0.005	0.046	0.026	0.029	0.034	0.011
43	0.027	0.015	0.004	0.018	0.005	0.012	0.012	0.032	0.035	0.024	0.044	0.008	0.019	0.007
44	0.043	0.055	0.049	0.046	0.001	0.022	0.002	0.038	0.035	0.058	0.010	0.013	0.002	0.004
45	0.016	0.014	0.023	0.026	0.008	0.028	0.010	0.037	0.004	0.014	0.025	0.031	0.014	0.003
46	0.058	0.023	0.031	0.001	0.015	0.016	0.025	0.037	0.044	0.068	0.049	0.043	0.030	0.004
47	0.004	0.052	0.044	0.022	0.022	0.003	0.016	0.047	0.021	0.007	0.014	0.027	0.045	0.007
48	0.070	0.019	0.015	0.046	0.032	0.011	0.002	0.029	0.009	0.081	0.024	0.012	0.029	0.011
49	0.009	0.011	0.064	0.033	0.033	0.027	0.024	0.065	0.049	0.002	0.055	0.002	0.013	0.018
50	0.060	0.038	0.001	0.014	0.024	0.021	0.009	0.016	0.032	0.079	0.016	0.014	0.004	0.027
51	0.024	0.046	0.073	0.003	0.013	0.003	0.018	0.093	0.007	0.012	0.025	0.025	0.021	0.034
52	0.048	0.025	0.014	0.019	0.002	0.017	0.008	0.006	0.048	0.075	0.062	0.035	0.039	0.020
53	0.043	0.008	0.067	0.034	0.011	0.030	0.026	0.085	0.043	0.021	0.020	0.043	0.052	0.003
54	0.034	0.007	0.027	0.048	0.024	0.007	0.005	0.042	0.004	0.073	0.028	0.051	0.036	0.016
55	0.066	0.017	0.065	0.052	0.040	0.020	0.011	0.058	0.038	0.034	0.072	0.048	0.021	0.036
56	0.015	0.023	0.040	0.046	0.037	0.029	0.025	0.058	0.067	0.071	0.023	0.047	0.004	0.009
57	0.096	0.025	0.069	0.041	0.022	0.001	0.026	0.013	0.028	0.051	0.035	0.048	0.015	0.023
58	0.010	0.021	0.051	0.040	0.004	0.038	0.023	0.133	0.013	0.069	0.085	0.053	0.035	0.022
59	0.095	0.010	0.079	0.042	0.018	0.012	0.025	0.062	0.061	0.075	0.025	0.061	0.057	0.022
60	0.047	0.009	0.063	0.050	0.044	0.033	0.034	0.080	0.081	0.067	0.050	0.064	0.082	0.015
61	0.070	0.038	0.104	0.064	0.066	0.020	0.022	0.209	0.042	0.111	0.107	0.057	0.075	0.047
62	0.107	0.059	0.073	0.085	0.042	0.040	0.001	0.028	0.005	0.066	0.027	0.046	0.065	0.022
63	0.025	0.002	0.162	0.069	0.010	0.019	0.040	0.178	0.062	0.181	0.088	0.025	0.056	0.003
64	0.221	0.083	0.084	0.041	0.034	0.073	0.002	0.309	0.144	0.065	0.158	0.008	0.047	0.008
65	0.075	0.021	0.235	0.011	0.103	0.005	0.034	0.005	0.166	0.363	0.030	0.065	0.037	0.005
66	0.241	0.069	0.092	0.116	0.202	0.118	0.069	0.432	0.148	0.064	0.268	0.175	0.027	0.031
67	0.474	0.096	0.807	0.334	0.198	0.172	0.102	1.147	0.132	0.779	0.447	0.266	0.018	0.182

TABLE 6

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 COMPREHENSION

RAW SCORE ITBS 11-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-6	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.359	0.730	0.336	0.873	0.348	0.708	0.799	0.214	0.018	0.672	0.352	0.744	0.246	0.567
2	0.115	0.014	0.115	0.157	0.079	0.010	0.083	0.113	0.038	0.044	0.139	0.028	0.033	0.149
3	0.040	0.368	0.011	0.270	0.038	0.276	0.344	0.080	0.061	0.274	0.051	0.324	0.116	0.146
4	0.013	0.057	0.042	0.144	0.102	0.037	0.056	0.0	0.083	0.037	0.013	0.013	0.021	0.165
5	0.010	0.189	0.070	0.102	0.033	0.142	0.190	0.077	0.105	0.175	0.001	0.202	0.038	0.023
6	0.018	0.093	0.084	0.131	0.015	0.065	0.029	0.022	0.100	0.030	0.004	0.003	0.076	0.135
7	0.033	0.084	0.066	0.046	0.051	0.067	0.148	0.016	0.048	0.134	0.0	0.138	0.038	0.042
8	0.052	0.123	0.054	0.119	0.042	0.092	0.002	0.039	0.003	0.022	0.009	0.018	0.012	0.054
9	0.073	0.018	0.048	0.022	0.012	0.011	0.103	0.053	0.036	0.114	0.020	0.096	0.007	0.087
10	0.056	0.147	0.046	0.105	0.012	0.085	0.026	0.059	0.073	0.015	0.032	0.033	0.021	0.005
11	0.022	0.028	0.049	0.014	0.031	0.036	0.056	0.055	0.046	0.103	0.047	0.061	0.030	0.059
12	0.011	0.083	0.054	0.092	0.042	0.028	0.055	0.056	0.003	0.008	0.062	0.050	0.036	0.052
13	0.045	0.062	0.050	0.012	0.025	0.078	0.014	0.048	0.038	0.099	0.042	0.033	0.039	0.007
14	0.053	0.036	0.035	0.079	0.011	0.022	0.069	0.035	0.060	0.001	0.019	0.065	0.040	0.056
15	0.013	0.089	0.019	0.014	0.001	0.024	0.024	0.020	0.016	0.092	0.004	0.008	0.038	0.037
16	0.025	0.061	0.003	0.065	0.012	0.062	0.023	0.003	0.025	0.009	0.025	0.069	0.036	0.008
17	0.060	0.086	0.016	0.020	0.020	0.026	0.062	0.019	0.060	0.076	0.049	0.016	0.031	0.049
18	0.017	0.027	0.037	0.052	0.027	0.009	0.019	0.042	0.016	0.019	0.033	0.041	0.025	0.033
19	0.026	0.052	0.042	0.027	0.033	0.039	0.017	0.037	0.027	0.060	0.007	0.038	0.017	0.005
20	0.051	0.048	0.018	0.039	0.032	0.040	0.048	0.008	0.050	0.030	0.019	0.014	0.009	0.038
21	0.066	0.027	0.007	0.036	0.027	0.013	0.027	0.023	0.007	0.045	0.045	0.061	0.001	0.037
22	0.039	0.064	0.034	0.024	0.023	0.011	0.0	0.050	0.035	0.041	0.028	0.012	0.009	0.005
23	0.032	0.007	0.037	0.047	0.020	0.031	0.023	0.015	0.036	0.030	0.0	0.033	0.020	0.024
24	0.017	0.076	0.006	0.010	0.018	0.040	0.044	0.023	0.009	0.054	0.029	0.036	0.033	0.045
25	0.051	0.069	0.026	0.058	0.017	0.020	0.024	0.045	0.052	0.014	0.039	0.007	0.035	0.017
26	0.001	0.058	0.041	0.005	0.016	0.004	0.005	0.003	0.015	0.067	0.009	0.046	0.021	0.008
27	0.051	0.021	0.006	0.045	0.017	0.010	0.012	0.043	0.029	0.002	0.023	0.019	0.005	0.032
28	0.014	0.044	0.031	0.020	0.018	0.023	0.025	0.022	0.036	0.063	0.042	0.019	0.010	0.033
29	0.039	0.028	0.033	0.027	0.020	0.034	0.037	0.027	0.009	0.019	0.010	0.045	0.027	0.011
30	0.024	0.035	0.006	0.036	0.022	0.031	0.026	0.036	0.054	0.044	0.024	0.008	0.036	0.011
31	0.033	0.034	0.049	0.009	0.026	0.021	0.014	0.018	0.008	0.038	0.038	0.027	0.017	0.030
32	0.029	0.028	0.013	0.052	0.030	0.012	0.005	0.044	0.038	0.024	0.004	0.035	0.002	0.032
33	0.029	0.037	0.033	0.009	0.031	0.004	0.003	0.015	0.023	0.060	0.033	0.0	0.022	0.012
34	0.032	0.024	0.028	0.033	0.026	0.002	0.009	0.046	0.023	0.001	0.028	0.032	0.039	0.005
35	0.029	0.036	0.020	0.028	0.020	0.007	0.014	0.018	0.038	0.062	0.009	0.029	0.017	0.021
36	0.032	0.025	0.041	0.012	0.014	0.011	0.018	0.043	0.009	0.022	0.048	0.003	0.005	0.036
37	0.032	0.033	0.012	0.048	0.006	0.013	0.021	0.027	0.051	0.038	0.012	0.034	0.029	0.024
38	0.026	0.027	0.048	0.008	0.003	0.016	0.023	0.033	0.002	0.049	0.029	0.026	0.031	0.008
39	0.039	0.027	0.008	0.030	0.012	0.017	0.024	0.044	0.047	0.012	0.032	0.004	0.007	0.005
40	0.021	0.033	0.052	0.030	0.022	0.017	0.024	0.016	0.013	0.072	0.012	0.035	0.020	0.018

TABLE 6 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 11 FORM 5 COMPREHENSION

RAW SCORE ITBS 11-S	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-6	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.049	0.019	0.010	0.007	0.033	0.016	0.023	0.070	0.027	0.019	0.049	0.026	0.041	0.030
42	0.012	0.042	0.051	0.045	0.028	0.015	0.021	0.009	0.024	0.042	0.003	0.003	0.014	0.031
43	0.063	0.007	0.015	0.017	0.016	0.012	0.017	0.053	0.028	0.052	0.045	0.032	0.014	0.020
44	0.001	0.054	0.047	0.019	0.003	0.009	0.013	0.044	0.034	0.010	0.017	0.030	0.044	0.010
45	0.061	0.068	0.026	0.043	0.011	0.005	0.009	0.018	0.020	0.072	0.035	0.001	0.018	0.0
46	0.018	0.038	0.037	0.006	0.027	0.0	0.003	0.081	0.043	0.029	0.028	0.029	0.014	0.009
47	0.046	0.026	0.045	0.030	0.037	0.006	0.004	0.028	0.012	0.035	0.028	0.035	0.048	0.017
48	0.039	0.017	0.020	0.035	0.021	0.014	0.012	0.037	0.053	0.075	0.037	0.007	0.017	0.024
49	0.027	0.049	0.073	0.0	0.003	0.021	0.021	0.090	0.004	0.009	0.022	0.022	0.018	0.031
50	0.065	0.008	0.003	0.036	0.017	0.030	0.025	0.023	0.063	0.058	0.045	0.045	0.049	0.036
51	0.003	0.032	0.065	0.032	0.040	0.020	0.014	0.045	0.003	0.061	0.020	0.016	0.012	0.031
52	0.073	0.038	0.037	0.004	0.030	0.010	0.002	0.106	0.060	0.009	0.050	0.013	0.028	0.027
53	0.027	0.0	0.034	0.041	0.007	0.003	0.012	0.035	0.011	0.080	0.021	0.045	0.043	0.023
54	0.046	0.037	0.065	0.032	0.020	0.017	0.027	0.038	0.058	0.054	0.052	0.028	0.001	0.021
55	0.064	0.039	0.009	0.003	0.049	0.032	0.014	0.114	0.018	0.022	0.026	0.002	0.045	0.020
56	0.014	0.006	0.069	0.041	0.029	0.016	0.004	0.069	0.054	0.100	0.052	0.034	0.033	0.020
57	0.095	0.026	0.070	0.040	0.001	0.002	0.025	0.012	0.027	0.052	0.036	0.047	0.016	0.022
58	0.028	0.057	0.013	0.002	0.038	0.022	0.015	0.095	0.051	0.031	0.047	0.015	0.067	0.024
59	0.060	0.029	0.101	0.037	0.050	0.026	0.010	0.141	0.037	0.119	0.054	0.018	0.015	0.028
60	0.083	0.002	0.067	0.054	0.012	0.002	0.029	0.050	0.049	0.063	0.037	0.056	0.045	0.034
61	0.014	0.024	0.030	0.017	0.033	0.025	0.001	0.047	0.048	0.034	0.083	0.041	0.052	0.043
62	0.116	0.050	0.132	0.024	0.069	0.024	0.034	0.149	0.046	0.136	0.019	0.005	0.013	0.041
63	0.050	0.058	0.084	0.072	0.020	0.007	0.002	0.185	0.062	0.091	0.127	0.037	0.092	0.032
64	0.067	0.042	0.033	0.045	0.040	0.043	0.039	0.068	0.045	0.026	0.013	0.080	0.025	0.018
65	0.144	0.028	0.160	0.002	0.087	0.004	0.006	0.059	0.062	0.153	0.114	0.041	0.063	0.0
66	0.066	0.017	0.143	0.050	0.019	0.041	0.031	0.197	0.043	0.162	0.069	0.006	0.075	0.022
67	0.148	0.010	0.011	0.104	0.073	0.011	0.029	0.351	0.111	0.008	0.085	0.065	0.026	0.052
68	0.133	0.008	0.186	0.061	0.102	0.051	0.003	0.203	0.042	0.167	0.178	0.110	0.149	0.052
69	0.670	0.016	0.340	0.006	0.005	0.007	0.039	0.0	0.161	0.368	0.025	0.060	0.032	0.010
70	0.313	0.035	0.097	0.073	0.189	0.086	0.067	0.243	0.041	0.125	0.268	0.014	0.162	0.052
71	0.123	0.079	0.210	0.205	0.118	0.020	0.049	0.550	0.266	0.182	0.150	0.141	0.145	0.101
72	0.302	0.177	0.635	0.220	0.172	0.101	0.032	0.975	0.040	0.607	0.275	0.284	0.154	0.010
73	1.014	0.287	1.347	0.206	0.540	0.191	0.014	1.687	0.672	1.319	0.987	0.274	0.558	0.290

TABLE 7

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM 5 COMPREHENSION

RAW SCORE ITBS 12-5	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-6	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.032	0.069	0.032	0.074	0.004	0.083	0.523	0.030	0.045	0.127	0.056	0.055	0.116	0.232
2	0.043	0.061	0.098	0.088	0.046	0.056	0.193	0.056	0.027	0.093	0.043	0.043	0.035	0.213
3	0.011	0.064	0.058	0.102	0.044	0.029	0.089	0.007	0.100	0.059	0.033	0.032	0.047	0.106
4	0.050	0.121	0.052	0.117	0.040	0.002	0.203	0.041	0.005	0.024	0.007	0.020	0.010	0.052
5	0.030	0.121	0.055	0.125	0.014	0.026	0.044	0.034	0.067	0.011	0.058	0.007	0.005	0.021
6	0.066	0.028	0.007	0.070	0.007	0.055	0.057	0.001	0.052	0.047	0.009	0.005	0.019	0.003
7	0.031	0.048	0.049	0.026	0.011	0.014	0.120	0.049	0.024	0.085	0.056	0.019	0.044	0.007
8	0.011	0.105	0.005	0.010	0.023	0.024	0.034	0.004	0.008	0.068	0.028	0.032	0.014	0.013
9	0.002	0.024	0.026	0.042	0.035	0.023	0.026	0.026	0.002	0.014	0.002	0.046	0.031	0.015
10	0.002	0.046	0.047	0.071	0.008	0.019	0.071	0.044	0.003	0.038	0.014	0.060	0.006	0.014
11	0.009	0.069	0.042	0.044	0.022	0.017	0.047	0.052	0.010	0.077	0.024	0.055	0.034	0.012
12	0.021	0.0	0.034	0.009	0.016	0.027	0.004	0.050	0.020	0.018	0.029	0.034	0.026	0.010
13	0.039	0.064	0.034	0.024	0.023	0.0	0.030	0.050	0.035	0.041	0.028	0.012	0.009	0.005
14	0.055	0.030	0.040	0.056	0.003	0.023	0.058	0.038	0.055	0.093	0.023	0.010	0.003	0.001
15	0.027	0.033	0.050	0.034	0.026	0.024	0.035	0.021	0.035	0.010	0.015	0.031	0.011	0.007
16	0.004	0.053	0.036	0.0	0.021	0.005	0.008	0.002	0.010	0.072	0.004	0.051	0.016	0.013
17	0.039	0.009	0.018	0.023	0.005	0.012	0.016	0.031	0.017	0.010	0.011	0.031	0.017	0.020
18	0.039	0.067	0.006	0.045	0.007	0.025	0.035	0.047	0.048	0.058	0.029	0.006	0.015	0.028
19	0.062	0.009	0.032	0.010	0.017	0.026	0.043	0.010	0.028	0.018	0.047	0.018	0.010	0.037
20	0.047	0.048	0.042	0.023	0.026	0.014	0.024	0.032	0.006	0.052	0.024	0.041	0.003	0.037
21	0.024	0.023	0.008	0.048	0.031	0.005	0.007	0.039	0.043	0.019	0.001	0.030	0.007	0.027
22	0.026	0.034	0.030	0.012	0.032	0.003	0.038	0.012	0.026	0.057	0.030	0.003	0.019	0.015
23	0.041	0.033	0.037	0.024	0.032	0.009	0.020	0.055	0.014	0.010	0.037	0.023	0.035	0.004
24	0.015	0.022	0.006	0.042	0.033	0.014	0.031	0.004	0.052	0.069	0.005	0.043	0.031	0.007
25	0.050	0.043	0.054	0.006	0.032	0.018	0.035	0.061	0.009	0.004	0.030	0.015	0.013	0.018
26	0.011	0.012	0.009	0.031	0.027	0.021	0.024	0.006	0.037	0.059	0.033	0.013	0.008	0.031
27	0.051	0.050	0.046	0.031	0.020	0.023	0.014	0.056	0.025	0.026	0.006	0.042	0.031	0.031
28	0.015	0.003	0.016	0.006	0.012	0.024	0.006	0.020	0.023	0.036	0.048	0.020	0.031	0.019
29	0.045	0.056	0.047	0.044	0.002	0.024	0.001	0.040	0.037	0.056	0.012	0.011	0.004	0.006
30	0.026	0.004	0.013	0.016	0.010	0.023	0.007	0.047	0.014	0.004	0.035	0.041	0.024	0.007
31	0.033	0.048	0.056	0.024	0.025	0.021	0.013	0.012	0.045	0.063	0.024	0.018	0.035	0.021
32	0.046	0.010	0.002	0.034	0.033	0.017	0.018	0.070	0.011	0.035	0.028	0.015	0.003	0.035
33	0.012	0.041	0.060	0.006	0.016	0.013	0.022	0.031	0.047	0.023	0.030	0.043	0.031	0.023
34	0.070	0.017	0.017	0.048	0.002	0.009	0.025	0.027	0.011	0.081	0.026	0.010	0.027	0.009
35	0.015	0.055	0.040	0.009	0.024	0.003	0.029	0.084	0.046	0.026	0.031	0.026	0.011	0.006
36	0.042	0.022	0.049	0.034	0.033	0.004	0.029	0.032	0.016	0.031	0.032	0.031	0.046	0.021
37	0.051	0.029	0.008	0.023	0.009	0.012	0.027	0.025	0.041	0.087	0.025	0.005	0.005	0.036
38	0.006	0.028	0.065	0.021	0.018	0.021	0.025	0.082	0.025	0.030	0.043	0.043	0.039	0.021
39	0.062	0.024	0.035	0.035	0.038	0.032	0.024	0.055	0.031	0.026	0.013	0.013	0.017	0.004
40	0.040	0.033	0.022	0.011	0.008	0.025	0.024	0.002	0.040	0.083	0.063	0.027	0.031	0.012

TABLE 7 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

ITBS LEVEL 12 FORM S COMPREHENSION

RAW SCORE ITBS 12-S	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.017	0.018	0.079	0.046	0.026	0.014	0.024	0.059	0.017	0.047	0.006	0.030	0.026	0.029
42	0.075	0.040	0.035	0.002	0.032	0.002	0.024	0.104	0.058	0.011	0.052	0.011	0.026	0.029
43	0.039	0.012	0.022	0.053	0.005	0.012	0.026	0.047	0.001	0.068	0.033	0.046	0.031	0.011
44	0.019	0.046	0.080	0.005	0.047	0.027	0.027	0.011	0.057	0.081	0.025	0.001	0.026	0.006
45	0.077	0.006	0.054	0.048	0.011	0.031	0.027	0.069	0.027	0.023	0.071	0.047	0.032	0.025
46	0.050	0.053	0.005	0.011	0.035	0.014	0.023	0.128	0.032	0.036	0.012	0.012	0.031	0.034
47	0.010	0.002	0.065	0.045	0.025	0.004	0.020	0.072	0.058	0.096	0.048	0.038	0.029	0.016
48	0.070	0.051	0.095	0.015	0.026	0.025	0.016	0.013	0.002	0.077	0.061	0.022	0.041	0.003
49	0.075	0.010	0.034	0.045	0.035	0.036	0.012	0.048	0.063	0.016	0.0	0.032	0.020	0.023
50	0.013	0.044	0.028	0.017	0.023	0.015	0.006	0.110	0.036	0.046	0.062	0.030	0.058	0.039
51	0.050	0.019	0.091	0.047	0.040	0.010	0.0	0.151	0.027	0.109	0.064	0.028	0.005	0.018
52	0.114	0.035	0.104	0.017	0.025	0.037	0.007	0.087	0.086	0.100	0.0	0.036	0.069	0.003
53	0.054	0.031	0.038	0.051	0.041	0.029	0.015	0.021	0.020	0.034	0.066	0.027	0.016	0.025
54	0.013	0.025	0.029	0.016	0.034	0.001	0.023	0.046	0.047	0.033	0.084	0.040	0.051	0.042
55	0.082	0.044	0.098	0.058	0.035	0.034	0.028	0.115	0.080	0.102	0.015	0.029	0.047	0.020
56	0.121	0.013	0.155	0.013	0.051	0.037	0.019	0.186	0.009	0.162	0.056	0.042	0.024	0.004
57	0.048	0.060	0.082	0.070	0.022	0.002	0.008	0.182	0.064	0.089	0.128	0.035	0.090	0.030
58	0.028	0.003	0.006	0.006	0.079	0.039	0.005	0.107	0.084	0.013	0.052	0.041	0.014	0.046
59	0.106	0.060	0.072	0.084	0.001	0.039	0.018	0.029	0.006	0.065	0.026	0.047	0.064	0.021
60	0.150	0.022	0.154	0.004	0.081	0.006	0.033	0.053	0.076	0.147	0.108	0.035	0.069	0.006
61	0.065	0.042	0.202	0.081	0.040	0.059	0.021	0.138	0.102	0.221	0.128	0.065	0.016	0.037
62	0.025	0.048	0.112	0.019	0.050	0.031	0.004	0.228	0.012	0.131	0.038	0.025	0.106	0.053
63	0.119	0.019	0.018	0.075	0.102	0.029	0.015	0.322	0.082	0.037	0.056	0.094	0.055	0.023
64	0.219	0.081	0.082	0.043	0.002	0.071	0.038	0.307	0.146	0.063	0.156	0.006	0.045	0.010
65	0.130	0.011	0.189	0.064	0.105	0.003	0.021	0.200	0.039	0.170	0.175	0.113	0.152	0.049
66	0.016	0.070	0.303	0.080	0.091	0.086	0.004	0.086	0.075	0.284	0.061	0.026	0.054	0.065
67	0.109	0.055	0.301	0.045	0.034	0.039	0.035	0.039	0.200	0.329	0.064	0.099	0.071	0.029
68	0.246	0.032	0.164	0.140	0.171	0.067	0.034	0.176	0.108	0.192	0.201	0.081	0.208	0.015
69	0.345	0.120	0.012	0.012	0.104	0.085	0.005	0.328	0.044	0.040	0.353	0.071	0.077	0.073
70	0.172	0.030	0.161	0.185	0.069	0.049	0.054	0.501	0.217	0.123	0.199	0.190	0.096	0.100
71	0.029	0.096	0.362	0.053	0.270	0.152	0.034	0.702	0.312	0.334	0.002	0.011	0.297	0.051
72	0.270	0.145	0.603	0.188	0.204	0.032	0.036	0.943	0.072	0.575	0.243	0.252	0.186	0.022
73	0.576	0.006	0.909	0.232	0.102	0.274	0.100	1.249	0.234	0.881	0.549	0.164	0.120	0.148
74	1.000	0.301	1.333	0.192	0.526	0.014	0.018	1.673	0.658	1.305	0.973	0.260	0.544	0.276
75	1.710	0.409	2.043	0.902	1.236	0.656	0.306	2.383	1.368	2.015	1.683	0.970	1.254	0.266

TABLE 8

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES														
MAT E-F	CAT 3-A	CAT 4-A	CTBS 2-C	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.585	1.719	0.652	1.862	0.641	0.589	1.788	0.007	1.007	1.661	0.637	1.733	0.510	1.556
2	0.180	0.574	0.092	1.117	0.104	0.244	1.043	0.005	0.262	0.916	0.108	0.988	0.235	0.811
3	0.145	0.516	0.177	0.659	0.153	0.214	0.585	0.002	0.196	0.458	0.182	0.530	0.032	0.353
4	0.195	0.176	0.163	0.319	0.187	0.162	0.245	0.002	0.200	0.118	0.158	0.190	0.129	0.013
5	0.002	0.099	0.002	0.044	0.034	0.113	0.030	0.005	0.075	0.157	0.026	0.085	0.146	0.262
6	0.120	0.333	0.091	0.190	0.042	0.080	0.264	0.009	0.141	0.354	0.131	0.319	0.059	0.226
7	0.085	0.243	0.114	0.330	0.082	0.125	0.242	0.011	0.064	0.149	0.074	0.199	0.009	0.021
8	0.013	0.057	0.042	0.144	0.102	0.0	0.056	0.015	0.083	0.027	0.013	0.013	0.021	0.165
9	0.087	0.112	0.007	0.025	0.067	0.077	0.113	0.018	0.066	0.206	0.076	0.156	0.039	0.100
10	0.070	0.218	0.041	0.182	0.047	0.080	0.154	0.021	0.025	0.095	0.081	0.122	0.049	0.057
11	0.004	0.071	0.065	0.109	0.037	0.022	0.007	0.024	0.107	0.052	0.026	0.025	0.054	0.113
12	0.049	0.068	0.074	0.030	0.035	0.016	0.132	0.027	0.032	0.190	0.016	0.154	0.054	0.026
13	0.084	0.162	0.051	0.158	0.039	0.039	0.041	0.030	0.036	0.017	0.048	0.021	0.051	0.093
14	0.036	0.035	0.034	0.021	0.046	0.053	0.086	0.033	0.089	0.110	0.073	0.106	0.046	0.034
15	0.004	0.087	0.021	0.091	0.048	0.060	0.034	0.035	0.033	0.045	0.049	0.027	0.039	0.055
16	0.038	0.088	0.013	0.046	0.029	0.059	0.085	0.038	0.014	0.074	0.027	0.092	0.030	0.064
17	0.067	0.027	0.006	0.065	0.008	0.055	0.001	0.040	0.059	0.048	0.008	0.006	0.000	0.004
18	0.045	0.110	0.002	0.036	0.014	0.048	0.062	0.041	0.059	0.064	0.006	0.081	0.009	0.055
19	0.018	0.001	0.0	0.075	0.038	0.035	0.049	0.043	0.025	0.036	0.016	0.030	0.005	0.056
20	0.007	0.109	0.001	0.006	0.019	0.020	0.004	0.044	0.004	0.072	0.024	0.028	0.018	0.017
21	0.028	0.002	0.0	0.068	0.009	0.003	0.026	0.045	0.028	0.012	0.028	0.072	0.033	0.011
22	0.046	0.090	0.003	0.039	0.036	0.019	0.044	0.047	0.047	0.082	0.030	0.035	0.038	0.030
23	0.059	0.015	0.005	0.010	0.004	0.037	0.054	0.046	0.058	0.023	0.030	0.001	0.020	0.042
24	0.043	0.056	0.010	0.047	0.030	0.008	0.052	0.047	0.042	0.038	0.027	0.022	0.001	0.046
25	0.029	0.050	0.016	0.059	0.004	0.023	0.050	0.048	0.030	0.068	0.022	0.038	0.024	0.045
26	0.017	0.068	0.022	0.032	0.033	0.015	0.038	0.047	0.021	0.015	0.015	0.048	0.035	0.039
27	0.006	0.054	0.029	0.013	0.005	0.023	0.021	0.046	0.014	0.031	0.006	0.052	0.010	0.028
28	0.002	0.055	0.038	0.002	0.019	0.033	0.002	0.046	0.012	0.070	0.006	0.049	0.018	0.011
29	0.008	0.022	0.049	0.002	0.026	0.022	0.031	0.045	0.014	0.041	0.020	0.041	0.032	0.011
30	0.012	0.001	0.042	0.0	0.007	0.027	0.010	0.044	0.018	0.008	0.037	0.028	0.0	0.038
31	0.015	0.016	0.031	0.005	0.008	0.018	0.032	0.043	0.026	0.020	0.040	0.009	0.035	0.012
32	0.014	0.022	0.018	0.024	0.020	0.015	0.012	0.041	0.038	0.045	0.018	0.015	0.007	0.027
33	0.011	0.018	0.002	0.046	0.029	0.018	0.004	0.039	0.052	0.065	0.009	0.046	0.035	0.003
34	0.005	0.006	0.015	0.025	0.033	0.027	0.006	0.036	0.031	0.065	0.039	0.007	0.002	0.025
35	0.005	0.017	0.036	0.014	0.032	0.016	0.020	0.034	0.003	0.056	0.028	0.040	0.036	0.034
36	0.021	0.051	0.060	0.036	0.037	0.009	0.012	0.031	0.033	0.051	0.012	0.006	0.023	0.033
37	0.043	0.016	0.044	0.025	0.029	0.018	0.027	0.028	0.038	0.054	0.053	0.017	0.0	0.018
38	0.074	0.054	0.017	0.002	0.016	0.028	0.025	0.024	0.016	0.063	0.0	0.030	0.020	0.011
39	0.042	0.031	0.020	0.013	0.006	0.023	0.002	0.021	0.042	0.081	0.065	0.029	0.033	0.014
40	0.008	0.035	0.069	0.006	0.042	0.035	0.011	0.017	0.046	0.092	0.014	0.010	0.037	0.017

TABLE 8 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT ELEMENTARY FORM F READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES												
MAT E-F	CAT 3-A	CAT 4-A	CTBS 2-C	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-G	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
41	0.083	0.038	0.082	0.028	0.013	0.012	0.013	0.012	0.015	0.064	0.048	0.035	0.028	0.010
42	0.033	0.052	0.017	0.030	0.062	0.047	0.021	0.008	0.001	0.013	0.087	0.006	0.005	0.004
43	0.135	0.081	0.101	0.057	0.028	0.059	0.029	0.003	0.023	0.094	0.055	0.018	0.093	0.050
44	0.070	0.016	0.340	0.006	0.005	0.0	0.039	0.002	0.161	0.368	0.025	0.060	0.032	0.010

TABLE 9

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A EASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F READING (COMPR.)

RAW SCORE MAT I-F	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-W
1	0.341	0.712	0.354	0.895	0.349	0.018	0.781	0.196	0.081	0.654	0.370	0.726	0.228	0.549
2	0.077	0.624	0.077	0.119	0.041	0.038	0.645	0.075	0.084	0.082	0.101	0.010	0.071	0.187
3	0.021	0.307	0.050	0.331	0.099	0.061	0.306	0.064	0.084	0.213	0.010	0.263	0.055	0.085
4	0.070	0.026	0.093	0.061	0.019	0.083	0.027	0.082	0.082	0.120	0.070	0.070	0.062	0.186
5	0.095	0.193	0.016	0.207	0.072	0.100	0.129	0.025	0.081	0.070	0.096	0.097	0.024	0.082
6	0.081	0.036	0.042	0.002	0.003	0.048	0.100	0.032	0.077	0.159	0.048	0.132	0.053	0.006
7	0.055	0.126	0.057	0.122	0.045	0.003	0.005	0.036	0.073	0.019	0.012	0.015	0.015	0.057
8	0.037	0.054	0.012	0.058	0.024	0.036	0.067	0.033	0.069	0.078	0.016	0.060	0.043	0.088
9	0.024	0.074	0.027	0.032	0.015	0.046	0.099	0.014	0.064	0.088	0.041	0.106	0.016	0.078
10	0.014	0.080	0.057	0.095	0.045	0.003	0.052	0.053	0.058	0.005	0.061	0.047	0.033	0.049
11	0.007	0.024	0.025	0.050	0.013	0.038	0.024	0.025	0.052	0.061	0.041	0.005	0.020	0.031
12	0.003	0.105	0.003	0.002	0.015	0.016	0.008	0.004	0.045	0.076	0.020	0.024	0.022	0.021
13	0.0	0.026	0.028	0.040	0.037	0.025	0.002	0.028	0.039	0.016	0.0	0.044	0.029	0.017
14	0.001	0.043	0.050	0.068	0.011	0.016	0.003	0.047	0.031	0.035	0.017	0.057	0.009	0.017
15	0.001	0.079	0.032	0.094	0.012	0.027	0.010	0.042	0.024	0.080	0.034	0.064	0.041	0.022
16	0.001	0.020	0.014	0.029	0.034	0.007	0.020	0.030	0.017	0.038	0.049	0.054	0.006	0.030
17	0.004	0.029	0.001	0.011	0.012	0.035	0.035	0.021	0.009	0.006	0.036	0.047	0.026	0.040
18	0.008	0.068	0.015	0.001	0.009	0.009	0.035	0.014	0.0	0.045	0.020	0.045	0.024	0.042
19	0.014	0.043	0.026	0.010	0.031	0.015	0.010	0.012	0.007	0.066	0.006	0.045	0.006	0.023
20	0.022	0.008	0.035	0.016	0.012	0.029	0.017	0.014	0.015	0.027	0.006	0.048	0.034	0.003
21	0.030	0.019	0.042	0.018	0.011	0.009	0.028	0.018	0.023	0.010	0.019	0.046	0.018	0.020
22	0.041	0.042	0.048	0.017	0.032	0.008	0.006	0.026	0.031	0.046	0.030	0.035	0.009	0.038
23	0.052	0.060	0.051	0.014	0.008	0.023	0.026	0.038	0.039	0.062	0.042	0.023	0.036	0.011
24	0.055	0.047	0.051	0.010	0.018	0.023	0.014	0.056	0.047	0.024	0.047	0.009	0.021	0.018
25	0.041	0.034	0.050	0.003	0.023	0.009	0.009	0.052	0.053	0.013	0.039	0.006	0.004	0.027
26	0.026	0.025	0.046	0.006	0.005	0.002	0.025	0.031	0.046	0.051	0.031	0.024	0.029	0.006
27	0.008	0.020	0.039	0.017	0.035	0.013	0.023	0.003	0.039	0.059	0.025	0.043	0.033	0.031
28	0.012	0.018	0.027	0.030	0.004	0.024	0.014	0.033	0.032	0.018	0.021	0.027	0.010	0.007
29	0.035	0.021	0.013	0.045	0.031	0.028	0.011	0.078	0.027	0.024	0.017	0.004	0.014	0.024
30	0.061	0.028	0.006	0.037	0.009	0.020	0.011	0.038	0.021	0.072	0.015	0.021	0.038	0.020
31	0.058	0.038	0.033	0.018	0.032	0.012	0.016	0.016	0.016	0.047	0.016	0.046	0.036	0.005
32	0.031	0.053	0.066	0.004	0.007	0.004	0.025	0.086	0.013	0.005	0.018	0.018	0.014	0.027
33	0.0	0.035	0.062	0.029	0.043	0.003	0.017	0.042	0.010	0.064	0.023	0.013	0.009	0.028
34	0.038	0.011	0.023	0.002	0.004	0.011	0.001	0.046	0.008	0.069	0.032	0.047	0.032	0.012
35	0.082	0.021	0.027	0.021	0.038	0.018	0.027	0.056	0.009	0.004	0.044	0.020	0.059	0.002
36	0.068	0.053	0.097	0.013	0.028	0.027	0.002	0.015	0.010	0.079	0.063	0.020	0.043	0.005
37	0.023	0.008	0.064	0.053	0.013	0.037	0.027	0.146	0.014	0.082	0.091	0.055	0.022	0.009
38	0.034	0.051	0.018	0.031	0.061	0.048	0.020	0.001	0.023	0.014	0.086	0.007	0.004	0.005
39	0.112	0.004	0.146	0.022	0.042	0.046	0.009	0.195	0.035	0.153	0.165	0.051	0.033	0.005
40	0.112	0.054	0.078	0.080	0.005	0.045	0.006	0.023	0.056	0.071	0.032	0.041	0.070	0.027

TABLE 9 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

MAT INTERMEDIATE FORM F READING (COMPR.)

RAW SCORE MAT I-F	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-G	STEP 4-A	SRA BL-E	SRA GP-E	SAT I-W	SAT II-W
41	0.037	0.060	0.100	0.007	0.062	0.043	0.012	0.240	0.088	0.119	0.026	0.037	0.118	0.059
42	0.091	0.050	0.228	0.103	0.144	0.042	0.039	0.161	0.146	0.209	0.136	0.101	0.129	0.010
43	0.354	0.076	0.056	0.032	0.148	0.041	0.044	0.284	0.189	0.084	0.309	0.027	0.121	0.093
44	0.342	0.217	0.675	0.260	0.132	0.040	0.072	1.015	0.195	0.647	0.315	0.324	0.114	0.050

TABLE 10

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

STEP II LEVEL 4 FORM A PART 2 (COMPR.)

RAW SCORE STEP 4-A	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-B	SRA BL-E	SRA GP-E	SAT I-W	SAT II-W
1	0.159	0.058	0.159	0.201	0.123	0.044	0.127	0.118	0.082	0.375	0.183	0.072	0.011	0.105
2	0.056	0.094	0.005	0.181	0.067	0.037	0.093	0.087	0.120	0.363	0.050	0.050	0.058	0.128
3	0.048	0.123	0.054	0.161	0.015	0.030	0.059	0.052	0.070	0.105	0.026	0.027	0.046	0.152
4	0.074	0.145	0.068	0.141	0.056	0.022	0.024	0.017	0.019	0.003	0.031	0.004	0.034	0.076
5	0.041	0.132	0.061	0.120	0.003	0.015	0.011	0.045	0.078	0.058	0.047	0.018	0.006	0.010
6	0.019	0.075	0.054	0.100	0.040	0.008	0.047	0.048	0.005	0.089	0.056	0.042	0.028	0.044
7	0.054	0.037	0.036	0.078	0.010	0.001	0.068	0.036	0.061	0.109	0.020	0.066	0.041	0.055
8	0.016	0.010	0.012	0.056	0.021	0.009	0.014	0.012	0.016	0.089	0.016	0.060	0.045	0.001
9	0.036	0.008	0.018	0.033	0.027	0.019	0.038	0.023	0.035	0.061	0.052	0.022	0.043	0.052
10	0.039	0.018	0.048	0.009	0.002	0.030	0.018	0.038	0.038	0.043	0.011	0.016	0.039	0.008
11	0.002	0.023	0.007	0.017	0.018	0.030	0.041	0.015	0.006	0.030	0.030	0.053	0.032	0.046
12	0.037	0.023	0.040	0.044	0.031	0.014	0.010	0.021	0.045	0.020	0.025	0.021	0.021	0.003
13	0.049	0.019	0.008	0.043	0.015	0.002	0.010	0.041	0.027	0.014	0.021	0.021	0.007	0.030
14	0.020	0.009	0.050	0.008	0.001	0.019	0.018	0.008	0.010	0.012	0.029	0.036	0.008	0.030
15	0.005	0.004	0.011	0.029	0.012	0.024	0.019	0.020	0.046	0.012	0.020	0.011	0.026	0.008
16	0.031	0.023	0.027	0.034	0.025	0.001	0.010	0.045	0.024	0.014	0.027	0.033	0.038	0.006
17	0.054	0.047	0.050	0.010	0.032	0.022	0.004	0.065	0.013	0.019	0.026	0.019	0.017	0.014
18	0.051	0.039	0.020	0.042	0.024	0.012	0.026	0.056	0.051	0.025	0.020	0.016	0.005	0.017
19	0.030	0.0	0.009	0.012	0.014	0.019	0.004	0.051	0.018	0.034	0.039	0.045	0.028	0.011
20	0.011	0.045	0.037	0.029	0.007	0.010	0.023	0.054	0.024	0.047	0.007	0.020	0.038	0.0
21	0.011	0.009	0.066	0.035	0.002	0.029	0.026	0.062	0.047	0.062	0.057	0.0	0.015	0.020
22	0.036	0.050	0.061	0.009	0.012	0.009	0.026	0.081	0.005	0.081	0.013	0.013	0.009	0.022
23	0.064	0.029	0.046	0.013	0.021	0.009	0.011	0.106	0.064	0.066	0.041	0.022	0.037	0.018
24	0.086	0.017	0.031	0.025	0.034	0.022	0.023	0.092	0.004	0.044	0.048	0.024	0.055	0.002
25	0.059	0.026	0.018	0.029	0.051	0.031	0.016	0.064	0.079	0.015	0.016	0.036	0.036	0.007
26	0.020	0.058	0.004	0.017	0.067	0.034	0.033	0.013	0.014	0.026	0.100	0.007	0.018	0.009
27	0.041	0.016	0.007	0.019	0.066	0.026	0.013	0.054	0.071	0.050	0.039	0.054	0.001	0.044
28	0.156	0.018	0.019	0.106	0.065	0.008	0.037	0.359	0.119	0.209	0.093	0.057	0.018	0.060
29	0.305	0.103	0.028	0.052	0.064	0.125	0.040	0.368	0.084	0.243	0.332	0.111	0.037	0.033

TABLE 11

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES													
SRA BL-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
1	0.052	1.082	0.016	1.225	0.004	0.352	1.151	0.108	0.370	1.024	0.603	1.096	0.127	0.919
2	0.037	0.334	0.005	0.477	0.029	0.320	0.403	0.158	0.358	0.276	0.133	0.348	0.150	0.171
3	0.024	0.125	0.024	0.018	0.060	0.139	0.056	0.026	0.101	0.183	0.167	0.111	0.149	0.288
4	0.011	0.317	0.040	0.321	0.089	0.051	0.316	0.074	0.010	0.223	0.163	0.273	0.065	0.095
5	0.0	0.044	0.055	0.131	0.089	0.013	0.043	0.013	0.070	0.050	0.030	0.0	0.008	0.178
6	0.011	0.188	0.069	0.101	0.034	0.001	0.189	0.076	0.106	0.176	0.145	0.203	0.037	0.024
7	0.022	0.097	0.080	0.135	0.011	0.004	0.033	0.026	0.096	0.026	0.051	0.001	0.072	0.139
8	0.033	0.084	0.066	0.046	0.051	0.0	0.148	0.016	0.048	0.134	0.046	0.138	0.038	0.042
9	0.043	0.114	0.045	0.110	0.033	0.009	0.007	0.048	0.012	0.091	0.114	0.027	0.003	0.045
10	0.053	0.038	0.028	0.042	0.008	0.020	0.083	0.049	0.016	0.054	0.080	0.076	0.027	0.104
11	0.065	0.115	0.014	0.073	0.044	0.032	0.058	0.027	0.041	0.047	0.034	0.065	0.053	0.037
12	0.069	0.019	0.002	0.061	0.016	0.047	0.009	0.008	0.061	0.056	0.085	0.014	0.028	0.012
13	0.051	0.114	0.008	0.030	0.020	0.042	0.056	0.006	0.065	0.070	0.039	0.075	0.003	0.049
14	0.034	0.017	0.016	0.091	0.030	0.019	0.065	0.016	0.041	0.020	0.008	0.046	0.021	0.072
15	0.017	0.085	0.023	0.018	0.005	0.004	0.028	0.024	0.020	0.055	0.046	0.004	0.042	0.041
16	0.0	0.026	0.028	0.040	0.037	0.025	0.002	0.028	0.0	0.016	0.064	0.044	0.029	0.017
17	0.016	0.060	0.033	0.069	0.006	0.033	0.014	0.030	0.017	0.052	0.030	0.065	0.008	0.0
18	0.033	0.045	0.035	0.020	0.026	0.007	0.024	0.030	0.034	0.053	0.0	0.031	0.010	0.012
19	0.050	0.029	0.037	0.020	0.013	0.019	0.029	0.027	0.049	0.011	0.024	0.005	0.028	0.019
20	0.051	0.072	0.038	0.052	0.018	0.028	0.028	0.022	0.052	0.069	0.045	0.016	0.037	0.023
21	0.032	0.007	0.037	0.047	0.020	0.0	0.023	0.015	0.036	0.030	0.054	0.033	0.020	0.024
22	0.012	0.048	0.035	0.019	0.011	0.029	0.015	0.006	0.020	0.025	0.036	0.046	0.004	0.022
23	0.008	0.049	0.032	0.004	0.025	0.009	0.004	0.006	0.006	0.072	0.022	0.051	0.012	0.017
24	0.028	0.062	0.029	0.022	0.006	0.023	0.011	0.020	0.006	0.021	0.010	0.042	0.028	0.009
25	0.049	0.038	0.023	0.037	0.030	0.010	0.029	0.037	0.019	0.029	0.002	0.035	0.037	0.001
26	0.048	0.059	0.018	0.047	0.002	0.024	0.024	0.056	0.030	0.068	0.004	0.032	0.021	0.013
27	0.025	0.024	0.009	0.049	0.032	0.004	0.001	0.040	0.042	0.020	0.007	0.031	0.006	0.028
28	0.004	0.004	0.0	0.042	0.002	0.028	0.030	0.018	0.051	0.027	0.007	0.033	0.011	0.033
29	0.020	0.027	0.011	0.037	0.029	0.009	0.005	0.005	0.047	0.071	0.006	0.038	0.026	0.012
30	0.044	0.045	0.024	0.036	0.006	0.012	0.030	0.039	0.039	0.026	0.001	0.045	0.041	0.012
31	0.057	0.056	0.040	0.037	0.026	0.025	0.006	0.062	0.031	0.020	0.005	0.036	0.025	0.037
32	0.033	0.045	0.059	0.042	0.010	0.012	0.012	0.028	0.025	0.068	0.015	0.023	0.008	0.006
33	0.009	0.039	0.048	0.048	0.025	0.003	0.024	0.012	0.021	0.039	0.027	0.006	0.011	0.028
34	0.018	0.038	0.030	0.036	0.014	0.017	0.028	0.061	0.017	0.007	0.043	0.013	0.031	0.007
35	0.046	0.043	0.009	0.022	0.024	0.028	0.026	0.053	0.015	0.057	0.037	0.036	0.042	0.035
36	0.074	0.054	0.017	0.002	0.016	0.028	0.025	0.0	0.016	0.063	0.015	0.030	0.020	0.011
37	0.049	0.037	0.048	0.022	0.025	0.022	0.013	0.068	0.018	0.013	0.012	0.0	0.004	0.009
38	0.023	0.012	0.065	0.052	0.020	0.020	0.006	0.065	0.023	0.041	0.043	0.036	0.032	0.023
39	0.006	0.021	0.055	0.020	0.028	0.021	0.025	0.014	0.032	0.101	0.029	0.024	0.051	0.031
40	0.038	0.046	0.017	0.023	0.023	0.026	0.012	0.121	0.044	0.048	0.013	0.024	0.019	0.032

TABLE 11 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA BLUE FORM E READING (CONFR.)

RAW SCORE SRA BL-E	EQUIVALENT SCORES CAT 5-A	CAT 4-A	CTBS Z-Q	CTBS 3-G	ITBS 13-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-F	SRA GR-E	SAT I-W	SAT II-W
41	0.075	0.010	0.034	0.045	0.035	0.036	0.0	0.048	0.063	0.016	0.060	0.032	0.020	0.023
42	0.114	0.035	0.104	0.017	0.025	0.037	0.0	0.087	0.086	0.100	0.001	0.036	0.069	0.003
43	0.097	0.059	0.113	0.043	0.050	0.015	0.015	0.130	0.065	0.117	0.076	0.014	0.032	0.035
44	0.089	0.055	0.045	0.058	0.027	0.013	0.026	0.055	0.032	0.039	0.013	0.073	0.038	0.005
45	0.063	0.075	0.074	0.019	0.038	0.069	0.038	0.266	0.026	0.093	0.070	0.063	0.111	0.033
46	0.045	0.069	0.364	0.019	0.030	0.025	0.061	0.025	0.136	0.345	0.114	0.035	0.007	0.035
47	0.027	0.098	0.360	0.055	0.268	0.150	0.002	0.700	0.315	0.332	0.083	0.009	0.295	0.049

TABLE 12

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E READING (COMPR.)

RAW SCORE	EQUIVALENT SCORES													
SRA GR-E	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
1	0.087	0.014	0.087	0.129	0.051	0.028	0.055	0.085	0.010	0.072	0.111	1.031	0.061	0.177
2	0.0	0.044	0.055	0.131	0.089	0.013	0.043	0.013	0.070	0.050	0.0	0.296	0.008	0.178
3	0.021	0.096	0.081	0.134	0.012	0.003	0.032	0.025	0.097	0.027	0.001	0.152	0.073	0.138
4	0.070	0.141	0.072	0.137	0.066	0.018	0.020	0.021	0.015	0.004	0.027	0.242	0.030	0.072
5	0.023	0.114	0.048	0.118	0.021	0.033	0.007	0.027	0.060	0.018	0.065	0.024	0.012	0.028
6	0.061	0.033	0.012	0.075	0.002	0.050	0.005	0.006	0.047	0.042	0.014	0.187	0.014	0.002
7	0.012	0.029	0.030	0.045	0.008	0.033	0.019	0.030	0.005	0.066	0.046	0.010	0.025	0.026
8	0.021	0.081	0.027	0.022	0.009	0.008	0.032	0.028	0.024	0.091	0.004	0.132	0.046	0.045
9	0.044	0.070	0.032	0.004	0.004	0.016	0.046	0.035	0.044	0.060	0.044	0.029	0.015	0.061
10	0.058	0.014	0.004	0.011	0.005	0.038	0.055	0.001	0.057	0.022	0.031	0.077	0.021	0.043
11	0.055	0.034	0.032	0.025	0.018	0.014	0.034	0.022	0.054	0.016	0.005	0.061	0.023	0.024
12	0.051	0.076	0.046	0.036	0.034	0.012	0.012	0.038	0.047	0.053	0.016	0.020	0.021	0.007
13	0.053	0.040	0.030	0.046	0.013	0.033	0.010	0.048	0.045	0.063	0.033	0.083	0.013	0.009
14	0.058	0.002	0.019	0.055	0.010	0.007	0.031	0.052	0.045	0.021	0.046	0.036	0.039	0.024
15	0.047	0.040	0.013	0.051	0.030	0.019	0.031	0.045	0.048	0.021	0.042	0.015	0.014	0.038
16	0.033	0.063	0.012	0.039	0.001	0.019	0.006	0.041	0.054	0.064	0.035	0.056	0.009	0.034
17	0.016	0.027	0.014	0.028	0.030	0.008	0.018	0.028	0.046	0.026	0.032	0.052	0.028	0.019
18	0.006	0.007	0.022	0.018	0.001	0.027	0.030	0.005	0.035	0.011	0.018	0.037	0.037	0.003
19	0.029	0.037	0.033	0.009	0.031	0.0	0.003	0.015	0.023	0.060	0.033	0.008	0.022	0.012
20	0.058	0.056	0.049	0.001	0.009	0.029	0.023	0.047	0.009	0.033	0.038	0.030	0.012	0.027
21	0.035	0.028	0.044	0.009	0.017	0.003	0.015	0.046	0.006	0.019	0.045	0.046	0.002	0.033
22	0.002	0.001	0.022	0.018	0.029	0.026	0.013	0.007	0.024	0.072	0.046	0.052	0.005	0.018
23	0.035	0.023	0.004	0.026	0.008	0.004	0.020	0.040	0.043	0.016	0.036	0.039	0.011	0.001
24	0.056	0.045	0.036	0.033	0.013	0.026	0.011	0.051	0.048	0.045	0.023	0.030	0.015	0.017
25	0.015	0.045	0.054	0.042	0.031	0.003	0.018	0.006	0.027	0.045	0.006	0.024	0.017	0.034
26	0.031	0.025	0.017	0.049	0.027	0.030	0.015	0.074	0.004	0.020	0.013	0.021	0.018	0.020
27	0.060	0.007	0.027	0.042	0.012	0.001	0.010	0.017	0.021	0.071	0.036	0.022	0.017	0.001
28	0.011	0.009	0.066	0.035	0.002	0.029	0.026	0.063	0.047	0.0	0.057	0.024	0.015	0.020
29	0.046	0.024	0.013	0.028	0.014	0.007	0.005	0.030	0.046	0.082	0.030	0.031	0.010	0.031
30	0.049	0.037	0.048	0.022	0.025	0.022	0.013	0.068	0.018	0.013	0.0	0.039	0.004	0.009
31	0.013	0.048	0.049	0.016	0.035	0.016	0.027	0.029	0.013	0.077	0.036	0.041	0.004	0.015
32	0.085	0.051	0.024	0.009	0.043	0.013	0.011	0.093	0.047	0.022	0.063	0.026	0.015	0.035
33	0.018	0.045	0.079	0.004	0.048	0.028	0.001	0.010	0.056	0.082	0.024	0.008	0.027	0.007
34	0.062	0.041	0.007	0.001	0.047	0.002	0.012	0.116	0.020	0.024	0.024	0.012	0.043	0.022
35	0.048	0.040	0.103	0.007	0.048	0.034	0.022	0.035	0.020	0.099	0.083	0.037	0.063	0.025
36	0.043	0.042	0.002	0.013	0.053	0.015	0.030	0.080	0.066	0.016	0.032	0.029	0.052	0.009
37	0.078	0.047	0.119	0.019	0.061	0.018	0.028	0.123	0.055	0.136	0.036	0.003	0.033	0.039
38	0.027	0.058	0.011	0.024	0.068	0.041	0.027	0.006	0.007	0.007	0.093	0.041	0.011	0.002
39	0.111	0.055	0.127	0.029	0.064	0.005	0.029	0.144	0.051	0.131	0.014	0.018	0.018	0.046
40	0.013	0.038	0.047	0.035	0.057	0.037	0.035	0.148	0.059	0.054	0.093	0.032	0.055	0.005

TABLE 12 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SRA GREEN FORM E READING (COMPR.)

RAW SCORE SRA GR-E	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-F	SAT I-W	SAT II-W
41	0.153	0.013	0.119	0.039	0.046	0.041	0.035	0.018	0.041	0.112	0.073	0.023	0.104	0.041
42	0.0	0.023	0.137	0.044	0.025	0.006	0.025	0.203	0.037	0.156	0.063	0.047	0.081	0.028
43	0.213	0.075	0.076	0.049	0.008	0.065	0.006	0.313	0.152	0.057	0.150	0.002	0.039	0.016
44	0.010	0.044	0.329	0.054	0.065	0.060	0.026	0.060	0.101	0.310	0.035	0.060	0.028	0.070
45	0.327	0.049	0.083	0.059	0.175	0.014	0.071	0.257	0.027	0.111	0.282	0.077	0.148	0.066
46	0.018	0.107	0.351	0.064	0.259	0.141	0.011	0.691	0.324	0.323	0.009	0.051	0.286	0.040
47	0.740	0.170	1.073	0.068	0.266	0.274	0.164	1.413	0.398	1.045	0.713	0.026	0.284	0.016

TABLE 13

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE I FORM W PARAGRAPH MEANING

RAW SCORE	EQUIVALENT SCORES													
SAT I-W	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-X	SAT II-W
1	0.075	1.209	0.143	1.352	0.131	0.479	1.278	0.235	0.497	1.151	0.127	1.223	0.018	1.046
2	0.113	0.484	0.145	0.627	0.121	0.246	0.553	0.032	0.228	0.426	0.150	0.498	0.015	0.321
3	0.148	0.047	0.148	0.190	0.112	0.033	0.116	0.129	0.071	0.011	0.172	0.061	0.013	0.116
4	0.173	0.274	0.150	0.131	0.101	0.139	0.205	0.059	0.200	0.332	0.149	0.260	0.009	0.285
5	0.076	0.252	0.105	0.339	0.091	0.116	0.251	0.009	0.055	0.158	0.065	0.208	0.006	0.030
6	0.008	0.036	0.063	0.123	0.081	0.021	0.035	0.021	0.062	0.058	0.008	0.008	0.002	0.186
7	0.048	0.151	0.032	0.064	0.071	0.028	0.152	0.039	0.125	0.213	0.037	0.195	0.001	0.061
8	0.094	0.169	0.008	0.207	0.061	0.076	0.105	0.049	0.024	0.046	0.072	0.073	0.005	0.106
9	0.058	0.017	0.011	0.055	0.050	0.076	0.047	0.054	0.053	0.106	0.080	0.079	0.009	0.059
10	0.005	0.122	0.028	0.084	0.040	0.038	0.120	0.054	0.086	0.056	0.038	0.100	0.012	0.080
11	0.040	0.111	0.042	0.107	0.030	0.012	0.010	0.051	0.015	0.034	0.003	0.030	0.016	0.042
12	0.080	0.011	0.055	0.015	0.019	0.007	0.110	0.046	0.043	0.121	0.027	0.103	0.020	0.080
13	0.035	0.126	0.060	0.126	0.009	0.021	0.005	0.039	0.072	0.006	0.053	0.012	0.024	0.016
14	0.008	0.058	0.043	0.016	0.001	0.030	0.086	0.030	0.016	0.104	0.057	0.091	0.028	0.089
15	0.047	0.047	0.026	0.089	0.012	0.036	0.019	0.020	0.033	0.028	0.028	0.014	0.032	0.016
16	0.054	0.101	0.011	0.027	0.023	0.039	0.053	0.009	0.068	0.073	0.003	0.072	0.036	0.046
17	0.013	0.004	0.005	0.070	0.033	0.040	0.044	0.005	0.020	0.041	0.021	0.025	0.040	0.051
18	0.025	0.091	0.019	0.024	0.037	0.038	0.014	0.018	0.022	0.054	0.042	0.046	0.044	0.001
19	0.061	0.035	0.033	0.068	0.024	0.036	0.059	0.033	0.061	0.045	0.050	0.046	0.044	0.044
20	0.029	0.055	0.047	0.011	0.011	0.031	0.031	0.050	0.029	0.045	0.029	0.015	0.037	0.046
21	0.008	0.052	0.041	0.077	0.002	0.025	0.006	0.038	0.009	0.044	0.008	0.066	0.031	0.008
22	0.043	0.035	0.025	0.010	0.016	0.017	0.034	0.020	0.044	0.043	0.010	0.021	0.025	0.022
23	0.042	0.057	0.009	0.048	0.029	0.009	0.051	0.001	0.041	0.029	0.028	0.023	0.019	0.047
24	0.005	0.026	0.008	0.035	0.028	0.001	0.026	0.024	0.006	0.044	0.046	0.060	0.014	0.036
25	0.030	0.055	0.025	0.015	0.014	0.009	0.009	0.047	0.026	0.032	0.037	0.021	0.009	0.014
26	0.052	0.027	0.043	0.059	0.0	0.020	0.003	0.035	0.056	0.050	0.020	0.013	0.004	0.004
27	0.016	0.044	0.039	0.023	0.015	0.033	0.011	0.010	0.024	0.021	0.004	0.042	0.001	0.018
28	0.020	0.037	0.020	0.016	0.029	0.021	0.016	0.018	0.006	0.060	0.012	0.039	0.006	0.029
29	0.056	0.026	0.001	0.050	0.022	0.005	0.017	0.048	0.034	0.007	0.028	0.014	0.011	0.037
30	0.024	0.054	0.021	0.030	0.008	0.010	0.015	0.032	0.046	0.073	0.044	0.009	0.016	0.043
31	0.012	0.001	0.042	0.0	0.007	0.027	0.010	0.0	0.018	0.008	0.037	0.028	0.019	0.038
32	0.050	0.051	0.039	0.026	0.023	0.017	0.003	0.035	0.009	0.055	0.021	0.044	0.024	0.034
33	0.031	0.030	0.015	0.050	0.028	0.002	0.007	0.046	0.036	0.026	0.006	0.037	0.028	0.034
34	0.007	0.015	0.011	0.031	0.013	0.022	0.019	0.007	0.045	0.038	0.011	0.022	0.032	0.034
35	0.046	0.053	0.037	0.011	0.003	0.017	0.031	0.035	0.021	0.045	0.026	0.012	0.035	0.038
36	0.037	0.030	0.046	0.007	0.019	0.005	0.013	0.048	0.004	0.017	0.043	0.002	0.040	0.031
37	0.003	0.004	0.017	0.023	0.034	0.029	0.008	0.002	0.029	0.067	0.041	0.005	0.040	0.023
38	0.046	0.034	0.015	0.037	0.019	0.007	0.031	0.051	0.054	0.005	0.025	0.011	0.038	0.012
39	0.041	0.053	0.051	0.048	0.002	0.020	0.004	0.036	0.033	0.060	0.008	0.015	0.036	0.002
40	0.002	0.028	0.037	0.040	0.014	0.014	0.024	0.023	0.010	0.028	0.011	0.017	0.035	0.017

TABLE 13 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE I FORM W PARAGRAPH MEANING

RAW SCORE	EQUIVALENT SCORES													
SAT I-W	CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-5	ITBS 11-5	ITBS 12-5	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-X	SAT II-W
41	0.049	0.007	0.001	0.031	0.030	0.014	0.003	0.067	0.014	0.038	0.031	0.018	0.034	0.034
42	0.043	0.010	0.044	0.025	0.029	0.018	0.027	0.0	0.038	0.054	0.053	0.017	0.034	0.018
43	0.004	0.024	0.051	0.020	0.013	0.014	0.011	0.078	0.057	0.015	0.042	0.015	0.034	0.005
44	0.058	0.034	0.003	0.018	0.004	0.017	0.005	0.020	0.036	0.083	0.020	0.010	0.036	0.031
45	0.045	0.041	0.052	0.018	0.021	0.018	0.017	0.072	0.014	0.009	0.004	0.004	0.038	0.013
46	0.009	0.044	0.053	0.020	0.039	0.012	0.026	0.033	0.009	0.073	0.032	0.004	0.041	0.019
47	0.070	0.043	0.009	0.024	0.036	0.028	0.026	0.078	0.032	0.037	0.064	0.015	0.046	0.020
48	0.045	0.038	0.086	0.031	0.021	0.001	0.026	0.037	0.059	0.055	0.051	0.027	0.053	0.020
49	0.019	0.027	0.036	0.042	0.004	0.033	0.029	0.102	0.063	0.067	0.019	0.043	0.054	0.013
50	0.095	0.010	0.054	0.056	0.015	0.016	0.020	0.028	0.043	0.036	0.020	0.052	0.050	0.038
51	0.045	0.014	0.086	0.052	0.035	0.015	0.005	0.156	0.022	0.104	0.069	0.033	0.044	0.013
52	0.038	0.047	0.022	0.035	0.057	0.045	0.016	0.005	0.004	0.018	0.082	0.011	0.036	0.009
53	0.129	0.037	0.145	0.011	0.075	0.013	0.024	0.162	0.033	0.149	0.032	0.018	0.024	0.028
54	0.042	0.017	0.008	0.020	0.065	0.025	0.014	0.093	0.070	0.001	0.038	0.055	0.007	0.043
55	0.081	0.058	0.218	0.065	0.056	0.063	0.016	0.122	0.118	0.216	0.144	0.081	0.018	0.053
56	0.174	0.036	0.037	0.088	0.047	0.026	0.045	0.352	0.137	0.018	0.111	0.039	0.055	0.055
57	0.038	0.016	0.357	0.026	0.037	0.032	0.054	0.032	0.129	0.338	0.007	0.028	0.117	0.042
58	0.268	0.066	0.065	0.089	0.027	0.145	0.077	0.405	0.121	0.037	0.295	0.148	0.205	0.004
59	0.456	0.114	0.789	0.352	0.018	0.154	0.120	1.129	0.114	0.761	0.429	0.284	0.207	0.164

TABLE 14

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W PARAGRAPH MEANING

RAW SCORE SAT II-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-Q	CTBS 3-C	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
1	0.208	0.163	0.176	0.306	0.200	0.149	0.232	0.013	0.187	0.105	0.171	0.177	0.116	0.138
2	0.106	0.222	0.123	0.309	0.061	0.146	0.221	0.021	0.085	0.128	0.095	0.178	0.030	0.133
3	0.[illegible]	0.212	0.093	0.125	0.010	0.023	0.211	0.057	0.082	0.152	0.024	0.179	0.061	0.128
4	0.075	0.042	0.048	0.004	0.009	0.042	0.106	0.026	0.006	0.165	0.042	0.138	0.059	0.123
5	0.062	0.069	0.0	0.065	0.012	0.054	0.052	0.034	0.057	0.076	0.045	0.072	0.042	0.092
6	0.051	0.142	0.051	0.110	0.007	0.005	0.021	0.055	0.078	0.010	0.037	0.028	0.016	0.069
7	0.063	0.031	0.010	0.073	0.004	0.052	0.003	0.004	0.049	0.044	0.012	0.002	0.016	0.052
8	0.038	0.055	0.056	0.019	0.018	0.007	0.007	0.055	0.021	0.092	0.049	0.026	0.046	0.041
9	0.024	0.092	0.018	0.023	0.036	0.037	0.013	0.017	0.021	0.055	0.041	0.045	0.001	0.032
10	0.017	0.009	0.011	0.057	0.020	0.008	0.015	0.011	0.017	0.001	0.017	0.061	0.044	0.027
11	0.016	0.060	0.033	0.069	0.006	0.033	0.014	0.030	0.017	0.052	0.0	0.065	0.008	0.023
12	0.021	0.057	0.047	0.032	0.034	0.005	0.012	0.042	0.022	0.065	0.012	0.043	0.022	0.019
13	0.031	0.010	0.044	0.001	0.006	0.037	0.010	0.046	0.030	0.008	0.019	0.024	0.036	0.017
14	0.044	0.069	0.039	0.029	0.028	0.005	0.005	0.045	0.040	0.046	0.023	0.007	0.014	0.016
15	0.056	0.081	0.039	0.055	0.004	0.024	0.001	0.035	0.054	0.054	0.024	0.009	0.004	0.015
16	0.034	0.026	0.043	0.041	0.033	0.017	0.007	0.028	0.042	0.003	0.022	0.024	0.018	0.015
17	0.009	0.066	0.049	0.013	0.008	0.008	0.013	0.011	0.023	0.059	0.017	0.038	0.029	0.015
18	0.019	0.011	0.038	0.013	0.015	0.032	0.020	0.011	0.003	0.030	0.009	0.051	0.037	0.015
19	0.050	0.039	0.022	0.038	0.031	0.011	0.028	0.038	0.020	0.030	0.001	0.034	0.038	0.016
20	0.035	0.046	0.005	0.047	0.011	0.011	0.037	0.047	0.043	0.055	0.013	0.019	0.034	0.016
21	0.003	0.004	0.019	0.021	0.004	0.030	0.027	0.012	0.038	0.008	0.028	0.003	0.034	0.018
22	0.041	0.049	0.045	0.003	0.019	0.012	0.015	0.027	0.011	0.072	0.045	0.012	0.034	0.018
23	0.037	0.029	0.033	0.028	0.031	0.005	0.004	0.051	0.018	0.006	0.033	0.027	0.039	0.020
24	0.008	0.015	0.001	0.049	0.026	0.021	0.007	0.003	0.049	0.062	0.012	0.043	0.038	0.021
25	0.056	0.057	0.036	0.024	0.018	0.024	0.018	0.051	0.027	0.014	0.012	0.033	0.031	0.023
26	0.020	0.019	0.040	0.0	0.011	0.008	0.031	0.025	0.006	0.057	0.037	0.018	0.023	0.025
27	0.034	0.022	0.003	0.025	0.007	0.005	0.019	0.039	0.042	0.017	0.037	0.001	0.012	0.026
28	0.039	0.051	0.053	0.048	0.004	0.018	0.006	0.034	0.031	0.062	0.006	0.017	0.002	0.028
29	0.019	0.011	0.020	0.023	0.003	0.030	0.007	0.040	0.007	0.011	0.028	0.034	0.017	0.030
30	0.054	0.027	0.035	0.003	0.004	0.020	0.021	0.033	0.048	0.072	0.045	0.039	0.034	0.032
31	0.011	0.045	0.037	0.029	0.007	0.010	0.023	0.054	0.024	0.0	0.007	0.020	0.038	0.034
32	0.061	0.008	0.026	0.043	0.011	0.0	0.009	0.018	0.020	0.072	0.035	0.001	0.018	0.036
33	0.009	0.029	0.046	0.015	0.018	0.009	0.006	0.083	0.052	0.020	0.037	0.020	0.005	0.034
34	0.063	0.043	0.028	0.013	0.027	0.017	0.021	0.011	0.005	0.052	0.011	0.041	0.031	0.032
35	0.015	0.007	0.044	0.042	0.039	0.024	0.021	0.061	0.046	0.051	0.061	0.031	0.041	0.030
36	0.058	0.028	0.039	0.031	0.034	0.031	0.004	0.059	0.027	0.022	0.009	0.009	0.013	0.028
37	0.028	0.045	0.034	0.001	0.020	0.031	0.012	0.014	0.028	0.092	0.051	0.015	0.019	0.027
38	0.046	0.011	0.064	0.031	0.003	0.027	0.029	0.088	0.046	0.018	0.023	0.040	0.055	0.025
39	0.050	0.023	0.011	0.044	0.016	0.023	0.011	0.058	0.012	0.057	0.044	0.035	0.020	0.022
40	0.025	0.052	0.086	0.011	0.041	0.021	0.006	0.017	0.083	0.075	0.031	0.007	0.020	0.021

TABLE 14 (CONTINUED)

ASSIGNMENT ERRORS FOR CONVERTING RAW SCORES ON A BASE TEST INTO EQUIVALENT SCORES ON ALL OTHER TESTS

SAT INTERMEDIATE II FORM W PARAGRAPH MEANING

RAW SCORE SAT II-W	EQUIVALENT SCORES CAT 3-A	CAT 4-A	CTBS 2-G	CTBS 3-G	ITBS 10-S	ITBS 11-S	ITBS 12-S	MAT E-F	MAT I-F	STEP 4-A	SRA BL-E	SRA GR-E	SAT I-W	SAT II-X
41	0.084	0.019	0.029	0.023	0.036	0.020	0.025	0.094	0.002	0.002	0.046	0.022	0.057	0.019
42	0.066	0.014	0.049	0.055	0.009	0.020	0.016	0.089	0.074	0.080	0.032	0.054	0.013	0.017
43	0.073	0.048	0.092	0.018	0.023	0.022	0.003	0.010	0.005	0.074	0.058	0.025	0.038	0.016
44	0.052	0.033	0.011	0.022	0.058	0.024	0.023	0.071	0.075	0.007	0.023	0.009	0.043	0.014
45	0.032	0.001	0.073	0.062	0.022	0.028	0.018	0.155	0.009	0.091	0.082	0.046	0.013	0.012
46	0.117	0.032	0.101	0.020	0.022	0.034	0.003	0.084	0.082	0.097	0.003	0.039	0.072	0.011
47	0.029	0.056	0.013	0.026	0.066	0.043	0.025	0.004	0.005	0.009	0.091	0.002	0.009	0.009
48	0.062	0.024	0.078	0.065	0.015	0.048	0.020	0.095	0.096	0.082	0.035	0.049	0.067	0.008
49	0.117	0.009	0.151	0.017	0.047	0.041	0.004	0.190	0.005	0.158	0.060	0.046	0.028	0.006
50	0.018	0.043	0.052	0.040	0.052	0.032	0.030	0.153	0.094	0.059	0.098	0.005	0.060	0.004
51	0.085	0.060	0.091	0.063	0.022	0.018	0.021	0.050	0.027	0.044	0.005	0.068	0.043	0.003
52	0.144	0.028	0.160	0.002	0.087	0.0	0.006	0.055	0.082	0.153	0.114	0.041	0.063	0.002
53	0.028	0.015	0.165	0.072	0.003	0.022	0.037	0.175	0.065	0.184	0.091	0.028	0.053	0.0
54	0.096	0.042	0.041	0.052	0.121	0.052	0.023	0.295	0.059	0.060	0.033	0.096	0.078	0.002
55	0.227	0.086	0.092	0.033	0.008	0.081	0.010	0.297	0.136	0.073	0.166	0.016	0.055	0.003
56	0.081	0.060	0.238	0.113	0.154	0.052	0.049	0.151	0.010	0.219	0.126	0.091	0.119	0.004
57	0.080	0.026	0.330	0.016	0.005	0.010	0.009	0.010	0.171	0.358	0.035	0.070	0.042	0.006
58	0.261	0.017	0.149	0.125	0.186	0.052	0.015	0.191	0.093	0.177	0.216	0.066	0.214	0.007
59	0.272	0.070	0.061	0.085	0.031	0.149	0.073	0.401	0.117	0.033	0.299	0.144	0.004	0.009
60	0.022	0.147	0.311	0.104	0.219	0.101	0.051	0.651	0.364	0.283	0.049	0.040	0.246	0.010
61	0.292	0.167	0.625	0.210	0.182	0.010	0.022	0.965	0.050	0.597	0.265	0.274	0.164	0.011
62	0.724	0.154	1.057	0.064	0.250	0.290	0.148	1.397	0.382	1.029	0.697	0.016	0.268	0.013
63	1.444	0.143	1.777	0.636	0.970	0.430	0.266	2.117	1.102	1.749	1.417	0.704	0.988	0.015

Appendix G

FORTRAN Program for Producing NRS Scores for any Collection of Items

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C FORTRAN PROGRAM FOR ESTIMATING
C NATIONAL REFERENCE SCALE SCORES
C FROM ANY SET OF ITEMS FROM VOL. II
C ADAPTED FROM WRIGHT AND PANCHAPAKASAN...(1969)
C

      DIMENSION D(80),SI(80),B(100),SA(100),Y(100)
C INPUT K=NUMBER OF ITEMS
C INPUT D=ADJUSTED ITEM EASINESS AND
C       SI=STANDARD ERROR OF ESTIMATE OF
            ITEM EASINESS
      SC=.00001
      NGK=K-1
      DO 5 J=1,NGK
    5 B(J)=0.0
      DO 7 IT=1,50
      G=-J
      GP=0.0
      DO 6 I=1,K
      P=EXP(D(I)+B(J))
      PP=1.0+P
      G=G+P/PP
    6 GP=GP+P/PP**2
      G=G/GP
      B(J)=B(J)+G
      SD=G/B(J)+G
      ANS=(SD**2)-SC
      IF(ANS.LE.0.0) GO TO 8
    7 CONTINUE
    8 CONTINUE
      DO 11 J-1,NGK
      V=0.0
      C=0.0
      DO 9 I=1,K
      Y(I)=EXP(D(I))/(1.0+EXP(D(I)+B(J)))**2
    9 C=C+Y(I)
      DO 10 I=1,K
   10 V=V+Y(I)*Y(I)*S(I)*SI(I)
   11 SA(J)=SQRT(1.0/(C*EXP(B(J))+V/C**2))
      DO 13 I=1,NGK
      ICS=IFIX(B(I)*1.0.+200.5)
      ECS=SA(I)*10.
   13 WRITE(6,14) I,B(I),SA(I),ICS,ECS

C OUTPUT INCLUDES:
C 1.  I=SCORE GROUPS NUMBER
C 2.  B(I)=ABILITY ESTIMATE
C 3.  SA(I)=STANDARD ERROR OF ABILITY ESTIMATE
C 4.  ICS=NATIONAL REFERENCE SCALE SCORE
C 5.  ECS=STANDARD ERROR OF MEASUREMENT (NRS SCORE)
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